The Builder.

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ILLUSTRATIONS.

Selected Design for the Completion of the South Kensington Museum: Exterior View and Plan.—Mr. Aston Webb, Architect ..... *Extra Large Photo-Litho.*
Interior of Central Hall, South Kensington Museum (as Proposed).—Mr. Aston Webb, Architect ..... *Double-Page Photo-Litho.*
Buildings Visited by the Architectural Association in the neighbourhood of Shrewsbury:—
Condover Hall; Market Hall, Shrewsbury; Much Wenlock Abbey; and Buildwas Abbey ..... *Double-Page Ink-Photo.*
Feathers Hotel, Ludlow, and Ireland's Mansions, Shrewsbury ..... *Single-Page Ink-Photo.*
Pitchford Hall, Salop, and Old Houses, Frankwell, Shrewsbury ..... *Single-Page Ink-Photo.*

Blocks in Text.

Tomb, St. Mary's, Shrewsbury ..... Page 116
Haughmond Abbey 116
Old House at Much Wenlock ..... Page 117
Old House, Whitehall, Shrewsbury 117
Shipton Hall ..... Page 118

CONTENTS.

The Congress: Some Critical Annotations 113
Notes 115
Architectural Association: Twenty-second Annual Excursion 116
Seventh International Congress of Hygiene and Demography 118
Design for Completion of South Kensington Museum 124
Architectural Association Excursion: Places Visited 124
Competitions 124
Jesse Haworth Memorial Church 130
Re Carpenters and Joiners 130
Books: "Königliche Museen zû Berlin" (Berlin: W. Spemann); "Petits Edifices Historiques" (Paris: Libraires Imprimeries Réunies); C. Wise's "Rockingham Castle and the Watsons" (London: Elliot Stock); J. C. Buckmaster's "County Councils and Technical Education" (London: Blackie & Son); Sir Samuel Wilson's "Memorials of Edinburgh in the Olden Time" (London: A. & C. Black); W. T. Owen's "Bits of Canterbury Cathedral" (London: Sampson Low & Co.) 130
Safety of Scaffolds.—Brass.—Building Strategy 131
The Student's Column: Marbles, VII. 131
General Building News 132
Foreign and Colonial 133
Miscellaneous 133
Capital and Labour 134
Meetings 134
Recent Patents 135
Some Recent Sales of Property 135
Prices Current of Materials 135

The Congress: Some Critical Annotations.

IF the success of the International Congress of Hygiene there can be no doubt, so far as success can be gauged by large attendances and an evident public interest in the proceedings. During the sectional meetings one might go from room to room and find each room occupied by a large audience. The opening meeting at St. James's Hall was probably one of the most crowded audiences that has ever been squeezed into that uncomfortable and ill-ventilated place. The large attendance on this occasion was of course due in great measure to the presence of the Prince of Wales as President, and though in undertaking to preside the Prince no doubt gave an impetus to the Congress which it might otherwise have wanted, it is unfortunate that this was coupled with the condition of deferring the meeting till a period when so many people have left town, and when our foreign visitors could not see the Capital in the height of its "season" gaiety and animation.

The opening address read by the Prince, and which, as in the case of the Queen's Speech in Parliament, was evidently only a ceremonial address prepared for him to read, was a very perfunctory affair both in matter and manner, nor was the opening of the proceedings much enlivened by the hesitating oratory of Sir Douglas Galton, who on such an occasion and before so exceptional an audience might have prepared his opening remarks with more care. Many of our foreign visitors have set us a good example in this respect, and certainly have the advantage of us in fluency and clearness in explaining their views. A capital speech by Sir James Paget, and a reply from the Prince in his own person, gave more vivacity to the close of the proceedings. Among the speeches of the distinguished foreigners who successively addressed the meeting, that of Dr. Roth, the Surgeon-General of the Army of Saxony, was especially gratifying to the English portion of the audience on account of his recognition of the specially hygienic character of this country, and the warm and sincere tribute he paid to the memory of Parkes.

Mr. Korösi, of Budapest, quoted the words of the late Prince Consort on one occasion with reference to Congresses, that they awaken public attention to subjects which require attention, bring together those who are working on the same course, and pave the way to an agreement between different Governments and nations as to the method of studying subjects and bringing about improvements. In this wide sense there can be no doubt that an international meeting of this kind leaves its mark behind it, and audiences who are conscientiously endeavouring to follow a paper in an unknown tongue, if they do not see the immediate gain very clearly at the moment, may console themselves with the reflection that they are doing their part in the general machinery which is necessary for the interchange of ideas. On the whole there seems to have been much less of the spirit of scientific dissipation among the audiences than there usually is at such gatherings; it has been treated less as an amusement than as a matter of serious business. In some instances the common-sense of the audience has asserted itself in condemning the fancies of a doctrinaire hygienist, as in the case of the medical man who, in lecturing on the health of children, advised that they should not be allowed to take long walks, and that their walks should be limited to a defined distance. An attempt to carry a vote to this effect was, we are glad to say, met with derisive laughter and an almost unanimous holding up of hands against it.

The system adopted of taking the sectional meetings in one sitting every day, from 10 a.m. to 2 p.m., not at first proposed and only arranged at the last moment, has proved to work well. It is a little fatiguing, no doubt, but it has resulted in keeping the meetings together, at all events far better than is generally the case where there is a break at 1 p.m. and separate afternoon meetings afterwards. An audience once dispersed on these occasions is very difficult to get together again, and the success of the single morning meeting in this case may be taken as a useful precedent for other occasions of the same kind. On the first morning the Architectural Section had the credit of being the only one to begin punctually, and that it was not so on the second morning was due not to the President or Secretary but to M. Trélat, who was down for the first paper, and did not make his appearance till the middle of the morning. Punctuality is indirectly a kind of element in hygiene; certainly unpunctuality is a cause of vexation and worry and is an unhealthy state of the social organism, and punctual persons set a good example on such an occasion, which should be recognised and held up for imitation.

The proceedings of the Section of Architecture in Relation to Hygiene we are reporting fully, though only a portion can be given in our issue of this week. The President's address was mainly devoted to suggesting a connexion between sanitary conditions and the æsthetic side of architecture, a connexion which certainly exists and the existence of which has been very much neglected and overlooked. Sir A. Blomfield quotes some expressions of opinion on this point from writers ancient and modern which are significant and deserve the attention of those interested in the subject, though the *Times* apparently cannot understand them.

The two following papers dealt with a subject of predominant interest to Londoners, the treatment and extension of towns. The suggestion of Mrs. Basil Holmes, the extension of a city by means of a suburban neighbourhood with easy communication with the central city, is an idea naturally suggested by London, but not so easy to carry out in a systematic way. In an unsystematic way it is of course carrying itself out around London at this moment, and we imagine that it will be more according to the general wish that people should be left to suburbanise in an unsystematic manner, where and how they feel inclined, rather than become inhabitants of zone suburbs laid out according to the directions of a central authority. The paper by Herr Stübben, the City Architect of Cologne, on the "Hygienic Principles for the Extension and External Improvement of Towns," was a remarkably scientific arrangement of the subject, and as such is well worth attention; it may be observed on the other hand, that the iron rule of official interference which is prevalent in Germany has its disadvantageous side; that it tends to check building enterprise and to impose a dull uniformity in city architecture. The object which building legislation should aim at is the prevention of bad or insanitary building with the least possible interference with freedom of architectural style and treatment. In regard to the laying-out of public places, no doubt, the intervention of a central authority with a central idea may be more requisite, or at any rate more excusable.

M. Trélat, whose paper was really a lecture, rejoices in a remarkable capability of fluent speaking, but the impression on the whole was that there was more of fluency than of practical information in his discourse, at all events that he employed a good deal of speech in proportion to the extent of practical fact communicated. M. Cuypers's paper on the methods of building houses on piles in Holland is of interest chiefly as giving a sketch of methods of building employed under very peculiar circumstances, which are not likely to practically affect English architects. Mr. Cuypers was not present himself, and his paper was read for him; otherwise we might have hoped to elicit in discussion a little further information in regard to some points of this curious subject, and especially in reference to the floating cellars, rising and falling with the tide, which we are told are in use in Amsterdam. As a frank architectural confession that they are really living in the sea this should be noted, as the Dutch, since the time of Andrew Marvell's satiric verses on the subject, have been regarded as diligently occupied in persuading themselves and others that they were living on dry land, in spite of apparent facts to the contrary.

The subject of the sanitation of theatres, treated by Mr. Lennox Browne and Mr. Ernest Turner, led to revelations which, however discreditable, are hardly surprising, in regard to the free-and-easy manner in which the most ordinary requirements of sanitation are provided for in many theatres; though Mr. Browne's scriptural quotation, "they are whited sepulchres, which indeed appear beautiful outwardly, but within are ravening wolves," was more melodramatic than accurate. One of Mr. Ernest Turner's plans showed the method of arrangement of a w.c. in ladies' cloak-rooms which he says, and we can well believe him, is still "typical rather than unique." The necessary apartment is merely enclosed by a partition cutting off one corner of the room, leaving the closet without light or ventilation. The provision for actors' dressing-rooms appears to be much improved in general from what it was, but there appears still to be a too great tendency, in the planning of theatres, to leave such things as water-closets and lavatories to be added to the plan where they can be got in, instead of forming a portion of a complete scheme thought out beforehand.

Mr. Lawford's paper on "Four-inch Drains versus Six-inch Drains" was crowded out on the Wednesday on which it was announced to be read, nor are we aware at the moment of writing these remarks whether and when it found place in the proceedings. Mr. Lawford's view as stated in the printed copy of his paper, is that a 6-in. drain is too large to be self cleansing, and leaves an unnecessary amount of surface for deposit, and that a 4-in. drain is large enough for the ordinary purposes of house drainage. The argument is well put, and there is no doubt a good deal to be said in favour of his view, but we are nevertheless of opinion that the balance of advantage is on the side of the 6-in. drain. The 4-in. drain runs considerable risk, in our opinion, of setting up a stoppage even with the ordinary matter necessarily discharged down a soil drain, without the intervention of any object which has no right to get into the drains; and stoppage, even temporary, is a serious evil and inconvenience, and one which, when once set up, is likely to assume considerable proportions before it is discovered, and cause considerable trouble in getting rid of it.

Among papers read in the engineering section is an important one on Water Supply by Mr. Binnie, which gains considerable practical significance from the writer's position as Engineer to the County Council; and it is worth while to note here that Mr. Binnie sums up entirely against the practice of making use of rivers as stores from whence to obtain water supply. We may probably take this as some indication, in a negative sense at all events, as to the course which the effort to find a new and more adequate water supply may take when the matter comes, as it probably ultimately will, into the jurisdiction of the London County Council. We are glad to see Mr. Binnie's paper take this turn. The difficulty of finding an adequate water supply for London will be very great, but it will be better both for the river and the city if direct taking from the river can be ultimately abandoned.

Mr. Galton's presidential address in the Section of Demography will perhaps convey to the readers of it a distinct idea of the meaning of demography, a word which has received various definitions of late; but the point and object of the studies included under it will be quite evident to every reader of the President's address. The main subject as there set forth is not, however, so much within our scope as some of the applications of the study to special subjects, such as that treated in Dr. Ogle's paper under the head of "Mortality in relation to Occupation." The author gives a table of comparative mortalities in various trades and professions, taking the clerical profession, which is the lowest, as the standard for comparison, representing it by 100, and the other occupations by numbers in proportional reference to this standard. The comparative mortalities shown by this table are of considerable interest, and show differences in rate greater than might have been expected. Among the highest rates are innkeepers and liquor dealers (274), and those in hotel service (397). Builders, masons, and bricklayers come at 174, carpenters and joiners, 148; plumbers, painters, and glaziers 216; earthenware makers, 314; Cornish miners, 331. Cab and omnibus service is very high (267), and costermongers and street hawkers still higher (308). It would seem from even these selected figures that mortality is a good deal connected either with too sedentary and indoor a life, as in the case of innkeepers, or too exposed a life (hawkers), besides the high rate from deprivation of pure atmosphere coupled with hard work (miners). The author notes also that high rates occur in all occupations which require working in a constrained and cramped attitude; for example, in silk weaving, by the pressure of the chest against breast-beam of the loom, preventing the due expansion of the lungs; in lace-making and gloving, by contraction of the chest in stooping over the work. In another paper read during the Congress the habit of upright writing was strongly urged, in contradiction to the usually taught method of sloping writing, and it was shown by photographs of children writing that in sloping writing the body was always stooped forward over the paper, while this was unnecessary in upright writing. Architects and artists are very fond, as a class, of an upright hand, from æsthetic feeling; there is something allied to drawing in its style: it may be satisfactory to them to know that in the pursuit of an artistic hand they are also tending towards the least unhealthy manipulation. A third cause of high death rate is excessive work, but Dr. Ogle considers that brain work is much the most injurious to life in this respect, and points out that the long hours of physical work of the agricultural labourer do not lead to a high rate of mortality. The comparatively pure air which he breathes no doubt tells its tale in favour of vitality. From further statistics in the paper it would seem that the mortality of innkeepers is attributed to their being always within reach of liquor and consequently prone to indulge in it. The paper is one which should be studied by persons of all occupations, with a view to minimising at least whatever injurious results may arise from the special nature of their occupation.

We have before drawn attention to the fact that an exhibition of architectural drawings connected with sanitation was to form a feature at the Congress. These were arranged round the walls of the library of London University, which formed the reception-room of the Congress. The drawings exhibited, by architects of this and foreign countries, are mostly designs of Infirmaries, Workhouses, Schools, Workmen's dwellings and amongst the authors many well-known names appear. Mr. Carrick, of Glasgow, exhibits plans of workmen's dwellings, each of one apartment, showing screened recess for bed and other conveniences. The London County Council show the plans of Messrs. Gibson & Russell accepted in the recently-decided competition for the Municipal Lodging Houses for men, and there are also shown the Brook-street, Limehouse, scheme for dwellings, and the Boundary-street scheme. Mr. Rowland Plumbe is represented by his plans for the South London Polytechnic Borough-road Institute. These were recently on view at the Goldsmiths' Hall, and as we referred to them then we pass over them now.

Mr. R. Owen Allsop showed some plans which competed for the Harrogate Baths, and also some particulars of Turkish baths. Messrs. Farrow & Nisbett sent their designs for baths at Coventry.

The designs for Rotherhithe, Bermondsey, and Richmond Public Baths, by Messrs. Geo. Elkington & Son, which were exhibited at the Paris Exhibition, also appear here, as does the new underground Chalet for Charing-cross, designed by Mr. Chas. Mason.

Drainage plans of Poplar Union Workhouse showing work executed by Messrs. Clarkson are also hung.

Mr. Saxon Snell has a number of interesting drawings, amongst which may be mentioned St. Olave's Union Infirmary, Holborn Infirmary, Highgate and St. Marylebone Infirmary, Notting-hill.

The plans of hospitals exhibited by Messrs. Keith Young & Hull are a most interesting collection, and comprise Hospitals at Hastings with its circular wards, the Great Northern Central Hospital and its additions, and the Infirmary at Derby which were recently opened with considerable ceremony. The Hospitals Convalescent Home designs by Mr. Ernest Turner are also an interesting set.

Mr. Rogers Field is well represented by his charts of sanitary improvements carried out at Sandringham for the Prince of Wales, the President of the Congress. Mr. Rogers Field also shows the drainage executed at the Brompton Hospital for Consumption.

Mr. George T. Hine shows a design for Claybury Asylum for the County of London, whilst Mr. Waterhouse shows plans of the New Liverpool Royal Infirmary.

Various diagrams showing the geographical distribution of births and deaths from the principal diseases in Bradford, and other tabulated particulars bearing on the subjects treated by the Congress, are also shown.

With regard to the drawings exhibited, they are mostly by English architects, and may be considered fairly representative. These will be exceedingly interesting to our foreign visitors, but it is to be regretted that hardly any foreign designs are exhibited. The benefits to be derived from comparison would have been great, and the opportunity might have been taken greater advantage of.

The range of subjects gone over in the week is enormous, and the bulk of information and suggestion which will be contained in the Congress volume when printed will be very remarkable, and will certainly contain much that will be of permanent value in the study of conditions of healthful life.

Grammar Schools, Ruthin.—On the 11th inst. the foundation-stone of a new grammar school was laid at Ruthin. The buildings, which are expected to cost about 6,000*l.*, are being erected on a site near Ruthin. A central tower will contain the principal entrance to the school buildings proper. These last will consist of a dining-hall on the right and a suite of class-rooms on the left, one being used as the head-master's class-room, with the library and laboratory, which will be fitted up with all requisite appliances. Dormitories will be provided for thirty-two boarders, and accommodation will be formed altogether for about a hundred scholars. Mr. Thomas Brown, of Chester, is the contractor for the work, and Messrs. Douglas & Fordham are the architects.

NOTES.

THE opening ceremony of the Royal Archæological Institute meeting at Edinburgh took place on Tuesday, August 11, under the presidency of Sir Herbert E. Maxwell, Bart., in the lecture-hall of the Scottish National Portrait Gallery. The weather in Scotland had been very unfavourable during the week preceding the meeting, and many of the archæologists who arrived early on the scene began to fear that rain would mar the success of the Congress. On Monday, however, the sun shone out in all its brightness, and the visitors were able to enjoy the charms of the northern metropolis. The opening meeting was well attended, both by the Members of the Institute and Fellows of the Society of Antiquaries of Scotland; many of the latter had come back to town specially to support the President, Sir Herbert E. Maxwell, for Edinburgh, like London, is now out of season, a general exodus of the fashionable inhabitants always taking place towards the end of July. Everything points to a successful meeting, if only the weather will be favourable. The following are the chief places to be visited: Linlithgow, Stirling, St. Andrew's, Glasgow, the Roman Wall, Rosslyn, Borthwick, Crichton, Dunfermline, Dalmeny, and Craigmillar. At all these places antiquaries, well versed in their history and architecture, have been appointed to take the conduct of the party. An excellent handbook, edited by Thomas Dickson, of H.M. Register House, has been issued, and is now in the hands of the members of the meeting. Dr. Dickson has displayed his usual indefatigable zeal in the compilation of this work, which, we believe, will remain as a lasting and valuable memento of the Edinburgh meeting of the Institute. The papers to be read at the sectional meetings bid fair to be above the usual average. The principal contributors are John Evans, President of the Society of Antiquaries of London; Thomas Hodgkin, of Newcastle; the Right Rev. the Lord Bishop of Carlisle, Albert Hartshorne, F. Haverfield, James Balfour Paul, James Macdonald, of Glasgow; Emanuel Green, Cadwallader J. Bates, and the Rev. W. S. Calverley. Among the delegates from other societies and institutions are: Louis Dyer, of the Archæological Institute of America; the Rev. Professor Drennan, of Vassar College, U.S.A.; M. Gervaise Le Gros, of the Société Jersiaise; and M. Paul Saintenoy, and M. Edouard Van der Smissen, of the Société d'Archéologie de Bruxelles. We shall give a full report of the proceedings in another issue.

WE have received a plan and view, bearing the signature of Sir J. Whittaker Ellis, of a scheme for providing an inclined approach to Waterloo Bridge from the roadway of the Embankment, from a point near Charing Cross Underground-station on one side and near Temple-station on the other side, to be carried out in connexion with the County Council scheme of the new street from Holborn to the Strand. The method of forming the approach to Waterloo Bridge is to build out a new pier on each side of the bridge, outside the line of the Thames Embankment-wall, and rising gradually to the level of the bridge roadway. We can hardly regard it as a practicable scheme. The expense of building up the roadway and substructure from the bed of the river would be very great, and we imagine the Thames Conservancy would have something to say as to a scheme which would involve a further narrowing of the waterway of the river, already narrowed fully as much as it will bear by the Embankment. The plan also includes a proposal for removing the property between Holywell-street and the Strand, and for rebuilding it. We wish to see it removed, but not rebuilt. There would be a recoupment of outlay in the rebuilding no doubt, but money, though a very important element in public improvements, is not everything after all, and to build again on this strip after it is cleared would be throwing away a new chance of an open breathing space and trees, so much required at this part of London, and also throwing away the fine architectural effect from the opening out of the two churches.

UNDER the head of "Bumbledom and Disease," the *Times* this week printed a letter from a gentleman who recently took a furnished house in Kensington, which proved to have almost every sanitary defect which it is possible to imagine. This case again proves that a tenant should always have a house carefully examined by a competent person on his own behalf before he makes an agreement for a tenancy. We have over and over again urged the need of giving certificates to lodging-house keepers in regard to the sanitary state of their houses. But it is impossible that the principle can be carried out to the extent of the inspection of ordinary houses. It is possible, when houses are built or altered, for the local authority to find out sanitary defects, but it would be an impossible task to continually survey ordinary dwelling-houses.

IN his last monthly report to the Kensington Vestry, Dr. Orme Dudfield, in reference to the question of water-supply and constant service, reprints an interesting report which he made on the subject in 1872. It deals with the conditions under which constant service could be substituted for intermittent service, pointing out the difficulties to be guarded against in the way of altered fittings, and especially the danger of leaving to water companies too great latitude in regard to the power of enforcing their own ideas of fittings on the householder. It was owing to a jealousy on this head that the Metropolitan Board of Works never applied for constant supply, and, as Dr. Dudfield observes, the metropolis is largely indebted to some of the companies for their voluntary action in giving constant supply over portions of their several districts. The Kensington Vestry has passed a resolution to request the County Council to apply to the several water companies supplying the area of their parish for constant supply to the whole parish. The movement in favour of constant supply is, in fact, assuming a very decided form, and it will probably not be very long before we shall see it generally adopted in London.

WE understand that Mr. R. W. Schultz is going out to Megalopolis in the autumn at the request of the Managing Committee of the British School at Athens, in order to make accurate plans and drawings of the results of the recent excavations on the sites both of the Agora and the Theatre, and to record all the items of architectural evidence which have been brought to light. With Mr. Schultz's plans and evidence it ought to be possible to come to some reliable conclusion regarding the points at issue.

"THE Transactions of the American Society of Civil Engineers," vol. xxiv., contains an interesting paper by Mr. J. E. Watkins, on the "Beginnings of Engineering," in which attention is drawn to the engineering character of many of the works of ancient races. In those early days the professions of architecture and engineering were one, and many feats were then accomplished which even at the present day would be formidable undertakings, notwithstanding the scientific knowledge we now have at our command. In referring to the early bridge work in England, the author says "that the moneys collected from the churches not being sufficient for maintaining the bridges, we are told that in 1489 the Archbishop of Canterbury adopted the expedient of publishing a remission from purgatory for thirty days to such persons as should give donations towards the repairs of an arched stone bridge over the Medway." We should think the shareholders of certain railways, whose bridges are now occupying their serious attention, would be glad to know this fact. Mr. W. E. Worthera also contributes a paper to the same volume, in which he describes the laying out of the main outlet sewer at Mount Vernon, N.Y., where it was found that a large portion of the line had to be excavated through rock, and, in consequence, it was decided, for economical reasons, the sewer should consist of a concrete channel, constructed *in situ*, with an arch covering in stone. This construction applied only to the main outlet sewer, in which there was no spur for house connexions; all the other sewers were of vitrified pipe of various diameters.

IN a note of August 14, 1888, we referred to the formation of a committee for the restoration of St. Helen's Church, Bishopsgate-within. The committee now announce that, in the opinion of Mr. J. L. Pearson, all the necessary and most, if not all, of the ornamental repairs, including the restoring of the monuments—in which this church is singularly rich—and the erection of a reredos could be carried out at an estimated cost of 7,000*l*. Towards that sum the Merchant Tailors' Company will, it is stated, contribute 2,000*l*., and the Charity Commissioners allot 4,092*l*. from out of the general fund established under the City of London Parochial Charities Act, 1883. Of the monuments, with some other features of this church, we printed an account on March 15, 1884, and another, with illustrations, on June 29, 1889. A plan made about four years ago shows that most of the tombs are collected in the Lady and Holy Ghost Chapels, eastern end, and in the "Nuns' Choir." The plan should be compared with one of the nunnery and church, published by R. Wilkinson, in 1817, and showing the general repairs made in 1808. On the removal hither in 1874 of eighteen monuments and brasses* from St. Martin's Oteswich, the Merchant Tailors' Company, patrons of the now united benefices, restored the chapels. The Nuns' Choir was added to the parish church *circa* 1216, and the screen between the two was removed at the Suppression. Forming, together with the "Void," the north aisle, it stands on a level above that of the nave; the nave is higher than the chapels. On July 27 last Dr. Tristram, Q.C., Diocesan Chancellor, granted a provisional faculty to lower portions of the floor, move some of the tombs, and re-instate upon wooden supports, for a side-altar, the original slab that formed the Lady Chapel *mensa*. It is desired to put into the crypt the very ugly tomb built during his life-time by Francis Bancroft (died 1726), the degenerate grandson of the archbishop, for the reception of his embalmed remains, and their periodical inspection by the masters of the Drapers' Company.† That "play of the dead volk," in what has been called the abbey of the city, has for some while been discontinued with the closing of the vault. St. Helen's was repaired in 1631-63—the oaken porch, western door, was set up by Inigo Jones, to whom also is attributed the design of the pulpit and sounding-board. At the repairs of 1865-8 the vestry and choir-vestry were placed in the "Void" the organ was removed from the western screen (1744) into the chantry, in front of Sir Julius Cæsar's altar tomb made by Nicholas Stone; the nuns' seats were arranged in the chancel choir, and the Spencer monument shifted to the west side of the south door In his "Curiosities of Puritan Nomenclature," 1880, Mr. C. W. Bardsley takes from the register the brief tale of Job-rakt-out-of-the-ashes, a child born on August 31, 1611, "in the lane going to Sir John Spencer's backgate" (Crosby-place), "and there laid on a heap of sea-cole ashes." The child was baptized the next day, on the following day he was buried.

* Including those of John Breieux (1459) and Nicholas Wotton (1483), rectors—brasses; Sir John Oteswich and wife Mary, co-founder *temp.* Henry IV.—altar tomb; Richard Staper, merchant (1608)—monument; Hugh Pemberton (1500)—with canopy; of the Tufnells, &c.

† It seems that the Drapers have hitherto been averse from the change, fearing it might invalidate the due discharge of certain trusts under Bancroft's will.

THE Strand offices of the *Field* and the *Queen* papers, next west of the Gaiety Theatre, are in course of being pulled down for an extension of the *Morning Post* premises in Wellington-street. The latter street was laid out in 1829-30 as an approach to Waterloo-bridge, opened on June 18, 1817. At this corner stood Wimbledon House, built, over against Exeter House, by Sir Edward Cecil, third son of Thomas, first Earl of Exeter, elevated Viscount Wimbledon, and died in 1638. It was afterwards occupied by a once famous shop, No. 346, next to Hodsott, the banker's,—that of D'Oyley, who gave his name to a new and highly-popular fabric, a "union" of wool and silk for cloths, towels, and the like, as well as, it is said, to the little dessert napkins commonly so-called.* The style "D'Oyley's" for these corner premises, latterly A. Walker & Co.'s, was not relinquished until within living memory, but they were rebuilt in 1838, as we read in Timbs's "Curiosities of London," after the designs of S. Beazley, who was architect, also, of the present Lyceum Theatre and its predecessor, burnt in 1830. The New Exeter Change, behind "D'Oyley's," was demolished nearly thirty years ago, for the Strand Music Hall, converted into the Gaiety Theatre, as designed by Mr. C. J. Phipps, and opened on December 21, 1868.†

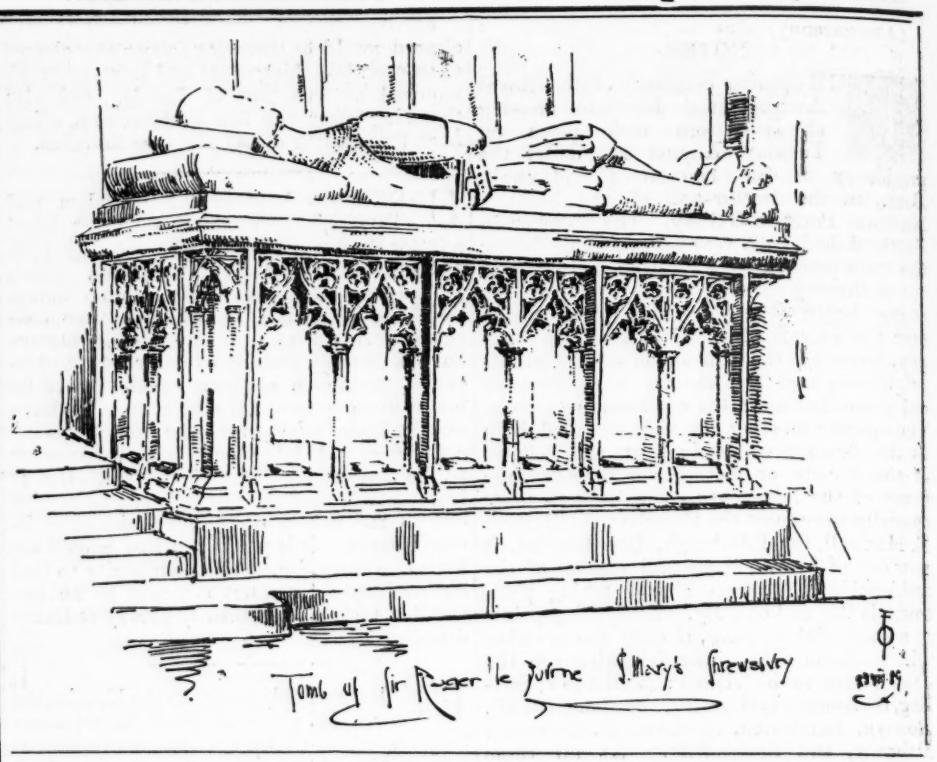
A COMPANY employed in exploiting a certain building stone, is circulating a lithographed letter among architects, marked "private and confidential," of which two or three correspondents have sent us copies. The letter gives statements as to the quality of the stone, which may be perfectly correct, but concludes with the following sentence:—

> "If you can introduce anything in our way, and would be good enough to make an appointment, we shall have much pleasure in waiting upon you for the purpose of discussing the matter, and, if possible, *to enter into some arrangement which, we trust, would prove to be mutually advantageous.*"

It is to be hoped that those architects who have received this invitation to accept an underhand commission will note the firm in question as one with which they will have no dealings. Possibly the Institute of Architects will have something to say to its members on the subject, as it has taken notice in very trenchant terms of other similar circulars.

THE entertainment given by the Lord Mayor at the Guildhall, on Tuesday night, was the great feature among the social amusements of the Hygienic Congress. There was a good deal of mismanagement about the invitations. It was ultimately found necessary to distribute tickets by ballot, as far more were desired than even the Guildhall would hold; but between the two arrangements some who had a right to invitations in the first instance never received them, or only obtained them after a great deal of trouble. The great hall full of people made a fine show, the Council Chamber was devoted to a harp performance, the picture gallery to glees, while bands were stationed in the great hall and ante-room. In the course of the evening the Lord Mayor and Lady Mayoress made a state procession round the rooms preceded by trumpets and accompanied by all the insignia of office; and it must have been a satisfaction to our French visitors to have seen in all the splendour of his office that high functionary whom they term the "Lor Maire," and to whom they attribute such extensive powers. But the great show of the evening, in an artistic sense, was the collection of plate belonging to the Corporation and the City Companies, which was arranged in glass cases in the library, and made a truly magnificent show in regard not only to richness and quantity but to artistic interest. It was said that it was seven years since this plate had all been collected and shown at one gathering in this way. The only bad thing in connexion with the festivity was the enormous invitation-card of which the visitor was invited to keep the larger portion "as a memorial," and only present the smaller one. Unfortunately the "memorial" was a piece of mere vulgarity which any one with artistic sense would probably be more disposed to put in the fire.

IT appears that a body called the "Society of Architects" is about to make a progress into Belgium, and has obtained promises of official receptions of various kinds. It is to be hoped that the donors of this hospitality are not under the mistaken impression that they are receiving a representative body of English architects. If so, it is a pity they did not make some inquiry first as to the status and position of their guests in the ranks of the English profession.



ARCHITECTURAL ASSOCIATION:

TWENTY-SECOND ANNUAL EXCURSION.

THE district to be visited this year by the Architectural Association being within the County of Shropshire, Shrewsbury has been made the headquarters for the present week. The majority of the party gathered at Shrewsbury on Saturday, and, as the official proceedings did not commence till Monday morning, Sunday was spent as a quiet day, the more so as heavy rain in the morning damped any enthusiasm for activity.

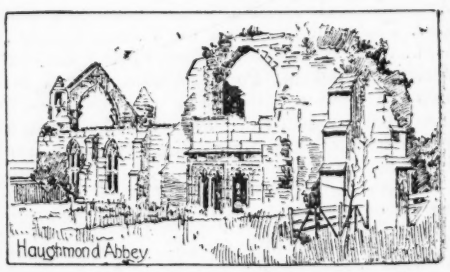
Monday.

Heavy rain early in the morning fortunately cleared off before the time of starting, and a fine day made the long drives about the beautiful scenery very enjoyable to the members. The first place visited was Wroxeter, where the church was first inspected. The chancel is of Transitional character, the nave somewhat later being fairly well established Early English. The most curious architectural feature of the church is the tower, which, standing at the west end of the nave, has been rebuilt in the time of Henry VII., and contains a large number of fragments of various dates, carving, tracery, and so forth, built into the walls. The effect is curious, and not altogether unpleasing. Within the church are some fine examples of late sixteenth and seventeenth century tombs, such as that of Sir Richard Newporte, who died in 1570, and John Berker of Haughmond, who died in 1618. The stalls and other fittings show in woodwork a treatment similar to that of the tower, the conglomeration of fragments of earlier work, in this case mostly of seventeenth century detail.

From Domesday we find that "Rainald held Rochester," and although there was only one "hide" of land, there were twelve and a-half teams of oxen, which has led some to believe that this points to extensive building operations being in progress, as such a number of teams is far more than would be required for purely agricultural purposes.

This corresponds with the date that the architecture of the chancel would lead us to assign for the erection of that part of the church.

The church was a collegiate one, and the four priests, who are also mentioned in Domesday, may possibly have been on the foundation. The Norman lords of the manor enriched it with endowments, and the Fitz Alans, who succeeded Rainald, had a residence here. Wm. Fitz Alan, after return from exile, was restored to his estates, and on the same day as his vassals rendered homage (July 25, 1155) he gave the church at Wroxeter to his monastery of Haughmond.



There seems to have been some doubt as to the validity of this gift, as it is not mentioned in Pope Alexander III.'s confirmation to Haughmond Abbey; this apparently led the Priors to obtain certificates from John le Strange and Roger de Powis as to their recollection of the event. These were, apparently, drawn up about 1175 (*i.e.*, twenty years after the gift).

Nothwithstanding this, the Fitz Alan family utterly ignored the claim of the Abbey to the church at Wroxeter; but in 1331 and 1332 Richard, Earl of Arundel, restored it to them.

After looking at the church a short time was spent by the excursionists amid the remains which have been excavated, of the Roman station of Uriconium. The interest of these remains is naturally more antiquarian than artistic, and accordingly a short time only was spent at this spot. The Roman station of Uriconium is first mentioned in the Geography of Ptolemy under the name of Viriconium. In the itinerary of Antoninus it is mentioned twice, and from that reference is easily identified. In the first place in which it occurs it is included among towns visited on the "*iter*," commencing on the Scottish border and passing to London by Chester and other towns whose sites are well known. It is, in fact, on the line of the Watling-street. The second mention of it shows it to be at the point where the road from Isca (Caerleon) and Golannium

* See Dryden's "Doily petticoats;" Steele's "Doily Suits," the *Guardian*, No. 102; Gay's "D'Oily habit," "Trivia I."; and Will Sprightly's letter to the *Spectator*, No. 319, by Budgell, &c. Compare, too, the etymology of *towel;* and O. H. German *dwahilla*, L. German *dwihle*.

† For an account of the new premises, in Bream's-buildings, Chancery-lane, of the *Field*, *Queen*, and *Law Times*, see the *Builder* of May 31, 1890.

(Abergavenny) joins the Watling-street. The whole of the site of the town, which is said to have exceeded in size that of Pompeii, has not been excavated, but sufficient has been uncovered to determine the position of the basilica and of the baths as well as of some of the houses, and many coins and antiquities have been taken from the site and placed in the Shrewsbury Museum.

Leaving Wroxeter an hour's drive brought the party to Buildwas Abbey,* where fifteen minutes only were allowed for the inspection of the remains of the fine Transitional work, a phase of English art which seemed of small interest to those who had not been touched with the enthusiasm of the late Edmund Sharpe, the director of so many of the earlier Architectural Association excursions.

Buildwas Abbey is said to have been founded by Roger de Clinton, in 1135. He was nephew of Geoffrey de Clinton, founder of Kenilworth Priory. This Roger was elevated to the See of Chester in 1129, having previously been Archdeacon of Buckingham, although he was not ordained priest until the day before his consecration to the Bishopric.

The Abbey was originally affiliated with the Abbey of Savigny, in Normandy, which was at first a Cistercian house; later it became the leader of a separate Order, called Savigniac or Tironeusian. In 1147, however, it was re-united to the Cistercian body, together with most of its affiliated branches. Buildwas, founded during the independence of Savigny, took precedence as the second or third Savigniac house in England, but when it became merely Cistercian it lost this position.

The site of the Abbey, in a solitary valley in the midst of beautiful scenery, is eminently that of the Cistercians.

The abbey church retains more of the features of a Cistercian than of a Benedictine plan, though the situation of the cloister and chapter-house to the north of the church is not a usual Cistercian arrangement. The detail of the work is of charming delicacy and purity, with all its massiveness and dignity.

The pillars are massive, round, and seven on each side, symbolical of verse: "Wisdom hath builded a house, she hath hewn out her seven pillars."—Prov. ix., 1.

The two eastern pillars are accommodated to receive choir stalls; that on south side is octagonal, that opposite a combination of octagon and circle.

The rood screen was carried 3 ft. above capitals of nave piers, and a dwarf wall filled up the arches of nave towards each aisle.

The cloister is placed, contrary to the usual practice, on north side, owing to its proximity to the river. The west side was enclosed by wall with gateway of four orders, with Nook-shafts and Chevion mouldings. This fell in 1820.

Outside this western wall was the Guest House or "Hostry." It extended close to edge of river. The rectory was on north side of cloister. The chapter-house contains several thirteenth century coffins, with beautiful crosses. Some tiles *now in the dwelling-house* are of great variety, and bear arms of the Spencers and others.

Immediately to north of chapter-house was the stype or passage to the cemetery, and next to that the hall, a vaulted building in which, during inclement weather, the occupations usually carried on in the cloister could be followed. The cloisters had merely a part roof, with no enclosure towards the garth, and even in the hall the windows were unglazed and unshuttered, so that the monks might still live as if in the open air. To the east of the hall was the infirmary building.

A muddy walk of a good two miles uphill was the next item in the programme, and at the end thereof the pedestrians arrived at the loftily situated village of Benthall, where both the church and hall were visited. Benthall, though now of small importance, is, nevertheless of considerable antiquity.

In the church there is nothing of interest except some seventeenth-century roof trusses and a few old floor tiles. The hall, however, over which the visitors were conducted by Mr. Bateman, the occupant, whose pictures many had seen on the Academy walls, was a very great treat, providing internally a wealth of rich detail in seventeenth-century wood and plaster work, while externally the sketches were captuated by the admirably effective grouping, especially of the entrance front with its octagonal bays, contrasted with the square porch and the proof gables. Internally, the hall drawing-room and morning-room contain excellent fireplaces, panelling, and plaster work. It is interesting to note that though compared with Hatfield, Knole, or other similar mansions, this is but a small manor house, a long gallery has been considered an essential feature, and has been arranged on the upper floor, obtaining the sun, while the bedrooms are relegated to the back and north side. This makes the house somewhat uncomfortable to a modern occupant, though a perfectly right and intelligible treatment for the seventeenth century manner of life.

Leaving Benthall, a pleasant half-hour's drive brought the party to Much Wenlock, where the Priory, the parish church, and the

various half-timber houses in the town provided more than sufficient occupation for the two hours allotted.

Wenlock Priory was the oldest and most privileged, perhaps the wealthiest and most magnificent, of the religious houses of Shropshire. William of Malmesbury, who wrote in the earlier half of the twelfth century, tells us that St. Milburg, daughter of Merewald (who founded Leominster Priory), niece of Wulphere, and grand-daughter of Penda, Kings of Mercia, lived in a nunnery at Wenlock, and was buried there. The church of St. Milburg's time, which would be about the end of the eighth century, was doubtless destroyed by the Danes at the time of their conquest of Mercia, about A.D. 874. The good repute of St. Milburg and the efficacy of the miraculous cures of scrofulous disorders which took place at Wenlock sufficed to retain the same situation for future establishments. Leofric, Earl of Mercia, and his wife, Godiva, of Coventry fame, who lived in the reigns of Canute, Harold, Hardicanute, and Edward the Confessor, refounded a religious house here as at other older foundations. This establishment of Leofric's was probably of the usual Saxon character, a college of secular clergy, combining the monastic element to a certain extent, and may be dated between the years 1017 and 1035. This Saxon monastery fell into decay during the Conquest, until Earl Roger de Montgomery, the first Norman Earl of Shrewsbury, restored it between the years 1087 and 1094, with the important difference that he granted it to the Priory of La Charité-sur-Loire, which itself was an affiliated Priory of the great Benedictine Abbey of Clugny. St. Milburg still continued to be patron saint and miracle-worker, and her relics were translated to the front of the high altar of the new church on May 26, 1101. Wenlock continued a Clugniac Priory, not an Abbey, paying fines and contributions to the English Crown during French wars, until it was declared "Denizen" by Richard II. in 1395. This separation was recognised and completed by a Papal bull of Alexander VI. in 1494, but was never exalted into an Abbey. Its surrender to the Crown took place in 1540, when three of its bells were sold to Wolverhampton, where they still remain.

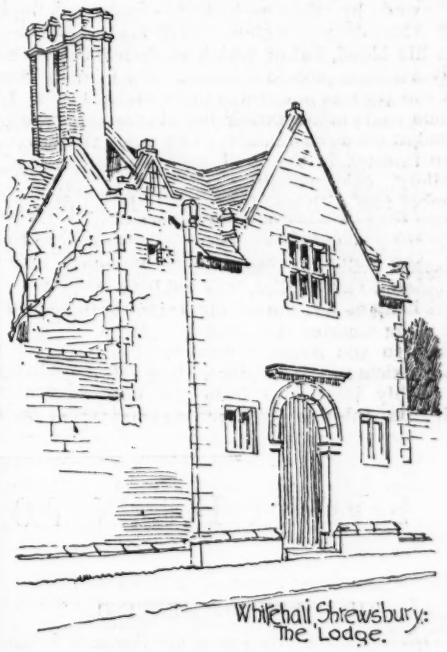
The plan of the church can be distinctly traced, the north and south transepts and the west end of the south aisle, with the library over, being the best-preserved portions of the church, and exquisite examples of pure and refined Early English work. The Norman chapter-house, with intersecting arcading, is complete up to the springing of the groining, the other most important remains being the prior's lodging and the prior's quad, with its interesting cloister on two stories, which together now form the residence of Mr. C. Milnes Gaskell, M.P., and were apparently erected at the time the priory was released from its dependence upon the foreign establishment. Within these buildings are some excellent examples of ancient art, a processional cross of Byzantinesque character, dorsals, chasubles, and other embroidery, besides woodwork of many dates and considerable interest.

In the parish church the visitors were shown the early registers, which date back to 1558, and are carefully preserved. The church is large, and has a very fine western Norman tower, of unusual height and with good proportion, so that one is at first struck by the merits of its design before being impressed by the antiquity of its construction.

The visit to Wenlock completed the first day's work, and the excursionists then returned to Shrewsbury.

Tuesday.

The work of this day commenced with a visit to one of the old Shrewsbury houses, Whitehall,



Whitehall Shrewsbury: The Lodge.

which was erected between 1578 and 1582 by Richard Prince, a celebrated lawyer, and has received the name of Whitehall from the fact that at some subsequent time the walls have been wholly whitewashed to cover the original colour of the red Grinshill stone which has been used in the erection. The visitors were unable to view the inside of the house, as the early hour made such a proceeding inconvenient to the occupants. The exterior, however, provided sufficient interest to occupy the time till a start had to be made for the railway station. The pigeon-house at Whitehall is interesting, with a nice red terra-cotta corbel table, which was noted in the sketch-books of many of the party, as were also the details of the entrance-lodge and the porch.

The members then proceeded to Church Stretton by rail, in order to lessen the heavy day's work of the horses, occasioned by the extremely hilly country through which the day's drive was taken. This was most enjoyable, the scenery being especially fine and varied in character, and fortunately the rain, although threatening at times, held off during the day. Church Stretton, formerly called Stretton-in-the-Dale, at which station the members detrained, is of some interest from an antiquarian point of view.

It came into the hands of Henry II., with the reputed value of 4*l.* per annum, which was the sum due from the sheriff in "fermor" of Stretton.

There was a royal castle here which Henry II. in the first year of his reign deputed to the custody of Engelard de Pitchford, afterwards known as Engelard de Stretton.

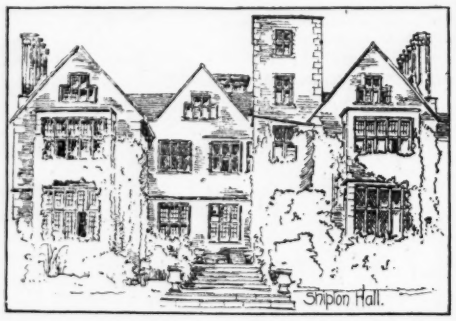
In 1253 this castle no longer existed, as a commission appointed to inquire into several matters for the ordering of the community of Stretton under its Provost so reports. The castle probably stood on the site known now as Brocards (or Brockhurst) Castle, of which Camden makes mention.

The church was one of the Saxon foundations of the Deanery of Wenlock. Domesday refers to the church of Stretton, and also to a resident priest. In 1290 Bishop Swinfield visited the church, but beyond the accounts for the victuals, &c., consumed on the occasion, we have no record. The church is cruciform in plan, with a central tower, with a vestige of

* See lithograph illustrations of this and some other places visited.

reputed Anglo-Saxon work in the north doorway, and forms a pleasing feature in the landscape.

The party, however, did not enter the town, but drove direct from the station to Plaish Hall by a long and exceedingly beautiful route, through narrow lanes and over hill and dale. Plaish, at the time of Domesday, was held by Roger de Lacy, in succession to Godin, the Saxon Lord of the Manor. It continued in the possession oi the Lacys for some time, and afterwards became the property of the Leightons, subsequently that of the late Mr. Ward Hunt, and then of Mr. Sayer, the father of the present owner. Mr. Sayer met the party and escorted them through the house from top to bottom, pointing out the various features and making the history clear, not omitting the story of the ghost of a former Squire Leighton, attested by the ineradicable stains on one of the doors, which tradition states to be his blood, but of which modern rationalism gives a more prosaic account. The greater part of the present house was built in 1533, though some parts of an earlier building with cusped, headed windows remain. The chief feature of the interior is the hall, with its screen and gallery, oak panelling, great fireplace, and timber roof with massive trusses. In the dining-room is some very fine old tapestry, with ornamented plaster frieze above and a decorated plaster ceiling. Some black hangings, embroidered with lilies, are said to have been first hung as a token of mourning at the death of King Charles the Martyr. Here, as elsewhere in the house, a very fine cast-iron fireback exists in the fireplace. The drawing-room is highly interesting from the oak-panelling, with its inlay of lighter ornamental woods, which, though somewhat rough in execution, are spirited in design. In this room the grate is a particularly fine specimen of cast-iron work. It is more than an ordinary fire-back, or even a collection of fire-backs, and is decorated with panels representing in bas-relief the Annunciation, the Baptism, and the Crucifixion from the New Testament history, and the Judgment of Solomon and the Visit of the Queen of Sheba from the Old Testament, with a figure of "Justicia" from classical literature. A particularly fine seventeenth-century cabinet, in which English and Italian work may be readily distinguished, is part of the furniture of the room. The White Room, so called from the painting which it has received, has an elaborately-designed chimney-piece and some interesting pictures and furniture of eighteenth-century date. Externally, the chief glory of the house are the chimney-stacks, in cut red



brick of rich design, which have been transferred to many of the sketch-books of the party. The north front of the house has two staircase turrets of octagonal form, with cupola roofs, which have been rebuilt from old drawings of the house as it stood in the past, but these features had been blown down and reduced to the eaves level. Leaving Plaish with much regret at the comparatively short stay, but with satisfaction at having been able to see it at all, the members then started for Shipton, which was reached after a long and hilly drive. At Shipton, the hall was again the chief attraction, the attention of the visitors being, however, confined to the exterior, as they were not permitted to view the interior beyond the hall, which has been considerably altered in the eighteenth century. The house is a picturesque seventeenth-century manor-house, of considerable size, with interesting terraces and steps leading up to the entrance. The back of the house has been remodelled in white brick in the eighteenth century, and has lost considerably in interest thereby. The church is small, and deficient in attraction. The chancel-arch and the nave appear to be of Norman date, though subsequently altered, and were therefore part of the church dependent upon Wenlock Priory. The chancel, as a brass upon its wall relates, was "rebuilded from the foundation" in 1589. The work of this date is curious, but the windows have been "restored" in modern times, and little of the Elizabethan detail remains beyond some woodwork internally and the finials to the buttresses externally.

Another long drive over the hills brought the party back to Church Stretton station, and the return home was made at about eight in the evening, after a long, but very enjoyable day.

We will next week continue our notes of the excursion.

SEVENTH INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.

THE OPENING MEETING.

THE inaugural meeting of the Seventh International Congress of Hygiene and Demography was held on Monday afternoon last in St. James's Hall, Piccadilly, which was crowded to its utmost capacity with the delegates and members of the Congress.

Before proceeding to report the opening of the Congress, we may say that this is officially the seventh, although practically the eighth, Congress of the series. The first Congress was held in Brussels in 1876, the second in Paris in 1878, the third in Turin in 1880, the fourth in Geneva in 1882, the fifth at the Hague in 1884, the sixth in Vienna in 1887, and an extra, although unofficial, Congress in Paris in 1889. Up to the present one, the Vienna Congress was the most numerously attended of any on record, and it was at that Congress (according to a useful *brochure* issued by the editors of the *Lancet*, and presented to members of the Congress)* that this country at last came forward to take its share in the work, and the Congress was invited to meet in London in 1889. But it was deemed to be futile to attempt to hold an International Congress in that year in any other city but Paris, which was then attracting all the world to its marvellous Exposition Universelle. It was therefore decided at Vienna, in 1887, that the next official International Congress of Hygiene should be held in London in four years' time, but that at the expiration of the usual interval,—viz., two years,—an unofficial Congress should meet in Paris during the time of the 1889 Exhibition. That Congress, though unofficial, was attended by official delegates from a great number of European Governments, was better attended than several of its forerunners, and proved in every way a great success.

The present Congress in London bids fair to surpass all the preceding congresses, both in the number of members attending it and in the variety, interest, and importance of the papers read in the various sections. The Congress is divided into two divisions, Division I., Hygiene, and Division II., Demography.

* Another useful and interesting publication issued in connexion with the Congress is "The Report of the Ladies' Sanitary Association to the Seventh International Congress of Hygiene and Demography." Miss Rose Adams, the Secretary of the Association, asks us to say that she will be pleased to send a copy of the report to any of our readers who will send her an addressed postal wrapper. Her address is 22, Berners-street, Oxford-street W.

Division I., Hygiene, is sub-divided into no fewer than nine sections, viz.,

Section I., Preventive Medicine, presided over by Sir Joseph Fayrer, and meeting in the Rooms of the Society of Antiquaries, Burlington House;

Section II., Bacteriology, presided over by Sir Joseph Lister, and meeting in the Rooms of the Royal Society, Burlington House;

Section III., The Relations of the Diseases of Animals to those of Man, presided over by Sir Nigel Kingscote, and meeting in the Rooms of the Geological Society, Burlington House;

Section IV., Infancy, Childhood, and School Life, presided over by Mr. J. R. Diggle, M.A., Chairman of the School Board for London, and meeting in the Theatre of the University of London, Burlington-gardens;

Section V., Chemistry and Physics in Relation to Hygiene, presided over by Sir Henry Roscoe, and meeting in the Rooms of the Chemical Society, Burlington House;

Section VI., Architecture in Relation to Hygiene, presided over by Sir Arthur Blomfield, A.R.A. (the honorary secretaries being Mr. Thomas W. Cutler, F.R.I.B.A., Dr. J. F. J. Sykes, M.B., Medical Officer of Health of the Parish of St. Pancras, and Mr. Ernest Turner, F.R.I.B.A.), and meeting in the West Examination Hall of the University of London, Burlington-gardens;

Section VII., Engineering in Relation to Hygiene, presided over by Sir John Coode (with Mr. Reginald E. Middleton, M.Inst.C.E., and Mr. H. C. Houndle, as honorary secretaries), meeting in the East Examination Hall of the University of London;

Section VIII., Naval and Military Hygiene, presided over by Lord Wantage, and meeting in the rooms of the Linnæan Society, Burlington House; and

Section IX., State Hygiene, presided over by Lord Basing, and meeting in the rooms of the Astronomical Society, Burlington House.

Division II., Demography, is not sub-divided. It is presided over by Mr. Francis Galton, F.R.S. (with Mr. Stephen N. Fox, Dr. Arthur Newsholme, and Mr. Adolphe Smith as honorary secretaries), and meets in the theatre of the Royal School of Mines (Geological Museum) in Jermyn-street.

The whole of the sections have been so far very well attended throughout their four hours' sittings (from 10 a.m. to 2 p.m.) daily.

The opening meeting in St. James's Hall, on Monday afternoon, lasted about an hour.

The President of the Congress, H.R.H. the Prince of Wales, having ascended the platform, he was presented by Mr. Thomas W. Cutler with a gold Congress badge, and

Sir Douglas Galton read the report of the International Permanent Committee of the Congress appointed at Vienna, which stated that committees had been organised in foreign countries to further the interests of the Congress in a more direct manner than could be done from England. Delegates had been appointed by all the Governments of Europe, and also by the United States, Mexico, Venezuela, Japan, Persia, Egypt, by the provinces and native States of the empire of India, by the most important colonies, and also by numerous municipal authorities, Universities, scientific and medical societies, and other institutions throughout the world, and large numbers of the most important authorities on the subjects to be treated of had sent communications to be laid before the Congress. The permanent committee had, therefore, every reason to believe that the Congress would be in every way worthy of the occasion, and would contribute largely to the promotion of sanitary science in all parts of the world. Sir Douglas, continuing, said that the Congress, which had the advantage of being presided over by his Royal Highness, had, in consequence of that, received a degree of support from the whole British Empire which was unparalleled. The Congress at present numbered more than any previous Congress. They had delegates from almost every country,—certainly from every important country, — in the world. They had also delegates from many British colonies, but he especially desired to emphasise that they had received a very large support from the British Indian empire. They had received large subscriptions from various native Princes, and they had about seventy delegates attending from India, many of whom were non-official delegates, and he believed that it was the first time in the history of the Congress,—even in the history of every Congress,—that India had contributed so largely to a meeting of this nature held in Europe. The organising committee had endeavoured to do all in their power to make the Congress a success.

The Prince of Wales, in the course of his address, said:—As one looks through our programme, it is impossible not to feel distress and even horror at the multitude of dangers to

health in the midst of which we have to live. Some of them appear at present to be inevitable, but the great majority may certainly with due care be averted. I cannot pretend to be able to judge but of a few of these dangers, but I would take as examples those to which my attention was especially drawn when I was a member of the Royal Commission on the Dwellings of the Working Classes. I learned much there of the dangers to health which may be ascribed to the constant increase of our great manufactories and to other industries from which especially come the overcrowding of our towns, the building of huge factories, the pollutions of our atmosphere, the accumulations of refuse, the fouling of rivers, the impurities of earth and air and water. I learned not only these dangers, but the immense difficulty of increasing or even maintaining our activity in all branches of trade without incurring heavy risks to health, more particularly in our chief centres of population. The task of averting them might have appeared hopeless, but I have rejoiced to see how much has already been done in diminishing them, and to observe how our registers bear witness to the decreasing mortality in our large towns, to the increasing average length of life in the whole population, and to many facts proving the good influence of our sanitary institutions. But on them I do not now propose to dwell; I will only conclude from them that the good already done, and the constantly increasing knowledge of the whole subject, may make us sure that much more good may still be attained, and that neither this nor any other nation should be content until prosperity in business and all other things desirable for the national welfare are made consistent with national good health. How the many dangers which our programme indicates may best be dealt with will, of course, be discussed in the several sections. It will be no trivial work if their sources and probable remedies can be clearly pointed out, and, especially if this can be done, as in a Congress such as this it should be, in a strictly scientific manner, calmly and dispassionately, without any reference to either general or municipal politics, or for any other purpose than the promotion of health. It is only on conviction such as may thus be produced that the appointed sanitary authorities can compel the changes necessary to be made, for such changes are almost always inconvenient or injurious to some, and might even seem unjust to them, unless it be made quite clear that they would be very beneficial to the community. But my hope is that the work of this Congress may not be limited to the influence which it may exercise on sanitary authorities. It will have a still better influence if it will teach all people, in all classes of society, how much every one may do for the improvement of the sanitary conditions among which he has to live. I say distinctly "all classes," for although the heaviest penalties of insanitary arrangements fall on the poor, who are themselves least able to prevent or bear them, yet no class is free from their dangers or sufficiently careful to avert them. Where could one find a family which has not, in some of its members, suffered from typhoid fever, or diphtheria, or others of those illnesses which are especially called "preventable diseases"? Where is there a family in which it might not be asked, "if preventable, why not prevented"? I would add that the questions before the Congress, and in which all should take personal interest, do not relate only to the prevention of death or of serious diseases, but to the maintenance of the conditions in which the greatest working power may be sustained. In this I include both mental and bodily power; for the highest possible prosperity must be when men and women of all classes, rich and poor alike, can safely do such good and useful work as they are fit for, and for which they are responsible to those among whom they live. To this end it is essential that they should enjoy the best possible health and vigour, and to obtain these it is necessary that everything possible should be done for the promotion and maintenance of the national health. Such, then, is to be your work: let me say our work, for though I cannot further contribute to the proceedings of the Congress, I shall watch them with much interest, and shall always strive to promote whatever may be here plainly shown to be useful for the public health.

Dr. P. Brouardel, Dean of the Faculty of Medicine, Paris, thanked H.R.H. in the name of the French members of the Congress, which had a sure guarantee that English public opinion was ready to second its efforts. The speaker traced to the Compulsory Registration Act of 1837, and its extension, brought about by Chadwick and Farr, those administrative reforms which had procured for the latter half of her Majesty's reign the title of "The Victorian Era." England had taken first rank in the formulation of laws for the protection of health. It was during the discussion in Parliament of an important Public Health Bill that a great statesman (Disraeli) pronounced, in the House of Commons, these memorable words, which should be repeated in all countries and in all Parliaments:—"The public health is the foundation on which repose the happiness of the people and the power of a country. The care of the public health is the first duty of a statesman." The improvements in sanitary laws made in England were regarded by surrounding nations as the ideal towards which their most ardent aspiration should tend. They invoked England's example when they claimed from the public authorities the powers necessary to oppose the epidemics which decimated their populations. The mere mention of the names of Jenner, Budd, Murchison, Sir John Simon, and, above all, of Harvey, proved how great were the obligations of the whole world to English scientists. On May 14, 1796,—a date which might well be the date of a great battle,—Jenner inoculated with vaccine matter, by means of two superficial incisions, the youth James Phipps. Long before, the great Harvey, by obeying the laws that govern the human mind, had made a discovery, the benefits of which were international, but if the benefit was to all, the glory was to one alone, and that country had the right to be proud of the moral authority which the genius of one of her children gives her. Within the last fifteen years medical doctrines had undergone a revolution that surpassed in importance all those of which history had taken notice. The greatest name in that period was Pasteur. When, at the beginning of a century, one could inscribe the name of Jenner, and at its end that of Pasteur, the human race might rejoice; more had been done for it against misery, disease, and death than in any one of the centuries which have preceded it. Besides her Majesty the Queen and the Prince of Wales, the City of London, the Organising Committee, and Dr. Corfield were entitled to the personal thanks of his compatriots. France, he declared in conclusion, hoped that the London Congress would occupy a place of honour in the lists of the Congresses of Hygiene.

Dr. von Coler, Surgeon on the Headquarters Staff of the German Army, said the great number of delegates present already at the Congress testified to the great interest taken by his country in its proceedings. They must interest keenly the whole world. What an enormous economy of life and national wealth had been made during the last twenty years! Comparing the years 1868 and 1888, there were 1,100 fewer deaths in the German Army, notwithstanding the increase in numerical strength. During the twenty years the death-rate had diminished by two-thirds, and comparing the year 1889 with 1888, there were in the German military hospitals 79,500 fewer cases of sickness. Such was the blessed influence of a knowledge of hygiene, and they were extended to all countries in the same proportion as to Germany. He confidently hoped that this seventh Congress would not be behind any of its predecessors in its beneficent results.

Prof. W. Roth (of Dresden), Surgeon-General of the Army of Saxony, said it was unquestionable that in the whole field of hygiene England had been foremost in practical work, thanks to the great number of eminent men who had devoted their powers to the study of that subject. England conducted experimental researches on a grand scale, and saved other countries the trouble of experimental investigation. The names of the late Edward Alexander Parkes, and his friend and successor, De Chaumont, were prominent in the annals of English hygiene, and he hoped that the spirit of those eminent men would guide the proceedings of the Congress.

Professor Corradi, of the University of Pavia, followed, saying he brought with him the salutations of Italy. Referring to Harvey's discovery of the circulation of the blood, he observed that that remarkable event signalised one of the greatest moments in the history of science, not only by the fact itself, but by the new spirit which it introduced into biology, in which lay the foundation of hygiene. To salute Harvey was to salute both Italy and England, who affectionately joined in celebrating his immortal name.

Mr. J. Korosi, Director of Municipal Statistics, Budapest, who spoke in English, after thanking H.R.H. for the warm interest he took in the Congress, saluted the genius of the great English nation. It was England alone, among all the nations of the world, that they must regard as the mother country of statistics, and especially of demography.

A vote of thanks to the Prince of Wales for presiding was proposed by Sir J. Paget, who, on its being seconded by Dr. G. Buchanan, put the proposition to the meeting, which accepted it amid great acclamation, and the Prince of Wales having replied, the organ burst forth with "God bless the Prince of Wales," the whole audience standing during the performance.

This terminated the formal proceedings of the opening of the Congress.

In the evening Sir Andrew Clark gave a banquet at the Royal College of Physicians to meet the Prince of Wales, and later on a *soirée* was held at the Royal College of Surgeons, at which there was a large gathering.

The real business of the Congress commenced on Tuesday morning at ten o'clock, when all the sections met in their respective meeting-rooms, and they were all well attended. We will now proceed to give, as far as our space allows this week, a report of the first day's proceedings. For obvious reasons we give the first place to

SECTION VI. — ARCHITECTURE IN RELATION TO HYGIENE.

With exemplary punctuality, the proceedings of this section commenced at the appointed hour, ten o'clock, when there was a very good attendance, which was maintained, and even increased, to the end of the sitting, which lasted a little more than four hours.

The President's Address.

Sir Arthur Blomfield, A.R.A., opened the business of this section by reading the following inaugural address:—

After the inaugural ceremony of yesterday, and the admirable address in which the Prince of Wales gave so cordial a welcome to the visitors of this great International Congress, you will doubtless be anxious to begin the work which lies before us in the next four days with the least possible delay.

I shall not, therefore, detain you with a lengthy address in opening the business of this section.

Its title, "Architecture in Relation to Hygiene," is clear and precise; but it has no doubt occurred to many who have read it that it involves a question to which it is by no means easy to give a clear and precise answer, "What is the relation of architecture to hygiene?"

The difficulty of answering lies in the uncertainty as to the strict limits of the functions and duties of the architect.

One of the greatest of our English authorities on the subject,—the late Mr. Fergusson,—in the introduction of his well-known handbook, defines architecture to be "The art of ornamental and ornamented construction," and further on, speaking of the architect, he says, "It would be well if, in most instances, he could delegate the mechanical part of his task to the engineer, and so restrict himself entirely to the artistic arrangement and ornamentation of his design."

If this view of architecture and of the legitimate duties of the architect were generally accepted as correct, the relation of architecture to hygiene would be reduced at once to something which is not always easy to trace or grasp, and which has never yet received the full amount of serious and careful attention that it well deserves. In that case most, if not all, of the valuable and interesting papers, which we are about to hear and discuss, would have to be addressed to some other more purely scientific section.

If, on the other hand, we take the more usual definition of architecture as "the art and science of building," its relations to the science of hygiene at once become too varied and too

complex to admit of clear and concise description. A vast field is at once opened out before us, in which it is often extremely hard, sometimes even impossible, to indicate with precision the line of demarcation between the domain of the architect and those of experts in other branches of science. As one out of many illustrations which might be cited of this difficulty, I may mention the wide and interesting subject of paving, which plays so important a part in the health, comfort, and well-being of communities. This large question seems to occupy a kind of neutral ground between the province of the architect and that of the civil engineer.

Many other similar instances might be given, but this one will be sufficient to show that the selection of subjects to be dealt with by this section must always be a matter of considerable difficulty.

Directly scientific considerations are admitted side by side with the purely æsthetic aspect of architecture, it becomes hard to name a subject for discussion at a Congress of Hygiene, which would not be as suitable for an engineering, medical, or other scientific section as it is for that of architecture.

For this reason I venture to throw out the suggestion that for some future meeting of this Congress an extremely interesting and instructive paper might be written dealing exclusively with the points of contact between hygiene and the purely æsthetic side of architecture.

This branch of a great subject remains up to the present time practically almost untouched, perhaps partly from the fact that to many minds the attempt to establish any such relationship appears fanciful and unpractical. It is well known that one of the greatest of our English pioneers of sanitary science, the late Sir Edwin Chadwick, viewed the idea of any such connexion with disfavour, and even with anger; he seemed, indeed, to think that art and hygiene were not only unconnected, but even in some respects incompatible.

Notwithstanding this decided opinion of a great and deservedly respected authority, I do not think it would be difficult to show that such a connexion has, at any rate for certain minds and constitutions, a very real existence; neither would it be hard to prove that, although never perhaps closely followed up or fully worked out in all its bearings, the idea of some actual relation between beautiful and artistic surroundings and health, must have been present in the minds of many writers both ancient and modern. Time forbids me to do more than instance a very few examples.

I cannot refrain from giving one of great weight and venerable antiquity which I find in the third book of Plato's "Republic":—

"Let our artists," he says, "be those who are gifted to discern the true nature of beauty and grace; then will our youth dwell in the land of health, amid fair sights and sounds; and beauty, the effluence of fair words will visit the eye and the ear, like a healthful breeze from a purer region, and insensibly draw the soul, even in childhood, into harmony with the beauty of reason."

Thus, it would appear, the great philosopher held that the finest productions of art, acting through the eye on the mind, exercise a distinct influence on bodily health; and if, as Emerson tells us, "Out of Plato come all things that are still written and debated among men of thought," we may take this passage as a type of many similar thoughts scattered through the works of numberless authors from his day down to the present time. May not the same idea be traced in the much-quoted line of our own poet Keats, "A thing of beauty is a joy for ever"? But instances will not be found wanting of more direct reference to a real connexion between the beautiful in art, and especially in architecture, and the science of health, or hygiene.

Eight years ago the late E. W. Godwin read before a meeting at the Health Exhibition, then being held in London, an elaborate and masterly paper on "Dress in its relation to Health and Climate." In the course of a parallel which he draws in that paper between dress and architecture, he says:—"Science and art must walk hand in hand, if life is to be worth living. Beauty without health is incomplete. Health can never be perfect for you so long as your eye is troubled with ugliness." He goes on to point out that long habit will no doubt accustom most people to any degree of ugliness, so that the mind untrained in art is seldom perhaps consciously troubled by it. But notwithstanding this apathy, a legitimate source of intellectual enjoyment is lost, and doubtless with it an appreciable element of health in its highest perfection; a loss which it is the business of the architect in some degree to supply by providing beautiful objects to satisfy and delight the eye, and by waging war with everything that is mean, ugly, and squalid.

At present, no doubt, large masses of people are still so habituated to these last characteristics in their every-day surroundings that they scarcely feel a wish for anything better, just as they will get accustomed to evil smells, and to a vitiated atmosphere which they breathe quite unconscious of its insidious and deadly effects on their health.

But if education and culture continue to advance as they have done in the last fifty years, and habits of intelligent observation are fostered and encouraged, the eyes of the masses will every day become more sensitive and fastidious; the dreary and monotonous streets, and badly designed buildings which a few years ago would have been passed unnoticed, will soon begin to exercise a distinctly depressing and disturbing influence on the mind, which cannot fail to have some ill-effect on the health, comfort, and general well-being of the community.

It is now, I believe, a recognised fact that certain colours, quite apart from the nature of the pigments or dyes which yield them, produce very decided effects, both on the mind and body when in certain conditions.

It is probable that the same is true of certain combinations of colours and even of forms in which the skill and taste of the artist must be paramount, and in which the aid of science, however necessary, can only be looked upon as subsidiary.

Valuable hints and suggestions bearing on this subject may be gathered from a lecture delivered many years ago at the Royal Institution by Cardinal Wiseman, entitled, "Points of contact between Science and Art." Also from an address delivered by Mr. Wyke Bayliss, President of the Royal Society of British Artists, "On Sanitary Reform in relation to the Fine Arts," at the Sanitary Congress held at Hastings in 1889.

As might naturally be expected from such a source, it teems with beautiful and poetical thoughts bearing on the subject. He shows how ruinous are dirt and disorder to the best interests of art, and how all artists must hail every onward step in sanitary reform as not only conducive to bodily health, but to the growth and progress of art. The whole cannot fail to be read with as much pleasure as profit, and any one who desires to follow out the line of thought I have suggested in tracing a direct connexion between architecture as a fine art and hygiene, will do well to study this address with great care and attention. But the illustrations, arguments, and advice made use of are directed more to the influence of sanitary reform on the growth and development of art than on the effect of art on health, a more obscure, perhaps, but no less interesting subject, and the one I desire to see dealt with.

I have left until the last all mention of the only writer who, as far as I know, has ever made any serious attempt to deal systematically and in detail with this interesting subject.

Some years ago, my friend, Dr. B. W. Richardson, who stands in the foremost ranks of sanitary authorities, delivered a lecture upon it, which, I am afraid, is now out of print, and I have been unable to obtain a copy; but he has kindly furnished me with some information about it.

He tells me that the principal points he dwelt on were as follows:—

He began by showing that much prejudice has been excited against some of the best sanitary inventions and labours, because leading sanitarians have failed to consider artistic construction as part of sanitary construction; their whole minds have been absorbed in the useful, and they have permitted all that is ornamental to pass by as if good taste were disconnected from sanitation. He argued that this was a grand mistake; that ugliness was an offence to good health; and that beauty was an aid to the best health.

He showed that when mind and body are enfeebled by bad health, the introduction of disagreeable objects into the sick room or ward is painful and injurious to the occupants; whilst the presence of beautiful flowers, pictures, and designs is curative in its effects; a kind of mental tonic which gives tone also to the body. This thought led him to the consideration of the best forms for hospital wards, having regard to the effect on the eye, and through the eye on mental and bodily health, and so with all the details of visible construction and of decoration.

Speaking of the dwelling-house, he maintained that no part ought to be excluded from the possession of architectural art, because it is the tendency of the human mind to let that which is disagreeable, plain, and ugly go without regard and accumulate dirt and disorder. Hence all the offices of a house should have as much care bestowed on them as the living rooms to render them bright and cheerful, and to make cleanliness as obvious a necessity in one as the other. In this lecture Dr. Richardson made a great point of the treatment of floors, adverting particularly to the Ancient Roman mosaic floors, which were not only beautiful works of art, but easily cleaned, and by the well-known hypocaust system of warming diffused an equable and agreeable warmth through the room without draughts.

Other points especially dwelt upon were the treatment of roofs, and the introduction of artistic water-fountains in different parts of the house.

No one could be found better qualified than Dr. Richardson to speak with authority on both the æsthetic and the scientific aspects of the question, "What is the relation of Architecture to Hygiene;" but even when writing in the interests of art he is naturally first of all a man of science, and I should like to see the same subject dealt with by an architect from an artist's point of view.

The conclusion of the address was the signal for a round of applause from the assembly.

Professor Ludwig P. Fenger, of the Royal Academy of Fine Arts, Copenhagen, rose to propose a vote of thanks for his able address, and also for his kindness in taking the chair in this section. Foreign architects did not look to England so often for architecture as to Athens, Rome, and to the old monuments in Italy generally, even to France and Germany. But since the beginning of this century England had taken a prominent part in hygienic architecture amongst the nations of Europe. England had first laid down the principle of constructing separate wards in hospitals; it had given the Continent the first hygienic models of lavatories, of gas and water constructions, and a great many other things. They could not even build a stable on the Continent without being indebted to England for its principle. As regarded the President of the section, he was well known, not only in this country, but also in all foreign parts, as a man of science and learning, and a true English gentleman in the best sense of the word, and he looked upon him as the worthy representative of the many clever men of which England was justly proud.

M. Charles Lucas, of Paris, said that, speaking on behalf of himself and all Frenchmen, he desired also to express thanks for the remarkable address they had just heard. Without dwelling upon the literary excellencies of the paper, he would limit himself to pointing out that two of the notable names mentioned in the address were as familiarly known in Paris as in London, viz., those of Chadwick and Godwin. With regard to the latter name, he desired to point out to what an important extent the *Builder*, of which the late Mr. Godwin was so long the editor, had contributed to sanitary improvement in regard to architecture.

Sir Arthur Blomfield briefly acknowledged the compliment.

Open Spaces.

The Earl of Meath, Chairman of the Metropolitan Public Gardens Association, next read the following paper on this subject, explaining that the paper had been prepared by the Hon. Sec. of the Metropolitan Public Gardens Association, Mrs. Basil Holmes, better known as Miss Gladstone, who with her husband, the Secretary, had made a special study of the subject:—

If we could transport ourselves into the England of 200 years ago, or if we were even able to see what our great grandfathers looked upon, how hard it would be to recognise the sites of those places which are now so familiar to us. A great part of the land was common land, or lammas land, heaths, downs, forests, woods, moors, and village greens. But the increase of

population, the concentration of the people into towns, the rapid growth of London and the manufacturing centres, these forces conjointly waged war against the open spaces, and gradually swallowed them up. Commons disappeared, fields and lanes became streets and houses, village greens were encroached upon or thrown into the roadways, graveyards were used as sites for railway stations, and public and private buildings of all sorts, and where the dead had peacefully slumbered was heard the noisy engine and the rattling train.

But the history of the desecration and loss of the open spaces round towns is too well known for me to dwell upon it here, and many will also be acquainted with the story of their revival, for it is but a recent one. Acts of Parliament have been passed to protect and regulate commons and greens, to preserve graveyards, to promote the acquisition of open spaces in and around towns, from the largest park to the smallest playground, and to provide for their maintenance. Philanthropic societies have started into existence, whose object it has been to carry out these Acts and stir up the public bodies to do so; and now, on all sides, the public mind is awakening to its need, and the public voice is beginning to ask for its satisfaction. But although something has been done to restore the lost breathing places, much, very much, still remains to be done; and what has been accomplished in the past in a scattered and unsystematic manner, will have to be done in the future, both thoroughly and systematically.

It appears to be a generally recognised and undisputed fact that, to restore enfeebled health or weakened animation, fresh air must be resorted to, *i.e.*, air that is not contaminated by the breath of human beings. We take the fainting person out of a building, we send the consumptive patient to the top of a Swiss pass or to the seashore, and we carry the sick child from his crowded home in the city and place him in a country village. It is only necessary to glance through those statistics which show the death-rate in the manufacturing and closely inhabited towns as compared to the death-rate in the country or the suburbs, to learn the generally well-known lesson that the health of the nation suffers in proportion to the degree that the individuals are crowded. Of course, I am aware that, notwithstanding the increase of population, there is a steady decrease in the death-rate over the United Kingdom, but this is due to improved drainage, warmer clothing, the great advance in medical knowledge, and a hundred other influences which are at work among the people; and, as this is now the case, who can say how robust the nation might have been by this time if the open character of the surroundings of the towns had been preserved.

It is strange to read of the time when the youth of London needed only to go to Moorfields (where Liverpool-street Station now stands) in order to stretch their limbs and sport in the free and open country; when Oxford-street was a country road; and the way to Islington, St. Giles, or Camberwell was through pleasant, flowery fields, by rural lanes and footpaths. Now, if we live in Islington and wish to see a meadow or a hedge, we must take the train and travel in it for some miles. Certainly there are Hyde-park, Regent's-park, and some 200 smaller recreation-grounds in London, besides a few open spaces on its borders; but, invaluable as they are, they cannot supply the place of the open country, nor are they really adequate to meet the wants of the vast mass of people who live round them.

Granted that fresh air and open spaces are needed for the health of the inhabitants of our larger towns, we will briefly consider the two ways of satisfying this need, namely:—1. A systematic acquisition and preservation of land for public recreation, in connexion with the towns and in relation to their growth. 2. Increased facilities for taking people from the towns into the country.

In the towns themselves the governing bodies—the councils,—should lay down and should carry out some such rule as the following:—That public recreation-grounds should be provided in each parish, in proportion to the number of its inhabitants.

This would mean that there should be a fixed minimum of open space for a certain number of the population. Here and there the minimum would be exceeded, and so much the better for the people, but it should always be reached, either by securing existing open spaces for the public for ever, or by acquiring new ones, and this, if need be, by pulling down houses for the purpose. And for the information of those who are not well acquainted with the question of acquiring open spaces, I would mention that much may be done in the towns by securing and throwing open enclosed and deserted squares, disused graveyards, the remnants of village greens (where such have become merged into the towns), vacant plots of railway land, abandoned wharves, market-places, &c. The Open Spaces Act of 1877, amended in 1881, 1887, and 1890; the Disused Burial Grounds Act of 1884, with its amendments; and other measures, give all the power that is needed to local bodies to carry out these improvements. The Metropolitan Public Gardens Association, which has been at work in London since the close of the year 1882, has laid out, or assisted to lay out, 65 gardens and playgrounds for the use of the public; has given grants of seats for 31 other sites, either streets or open spaces; has granted money towards the formation and upkeep of 23 public gymnasia; has secured the opening of 166 playgrounds belonging to the London School Board (on Saturdays); and the laying out and throwing open of 19 recreation grounds; has planted trees, and given grants for tree-planting in 37 thoroughfares and other sites; has opposed encroachments on 18 disused burial-grounds, commons, and open spaces; and has in other ways assisted in the preservation and formation of very many useful recreation-grounds. What has been done in London (and it is very little compared to what needs doing) can be done in the other large towns; there is the same opportunity for improving them by bringing green grass, bright flowers, and shady trees into the dingy and monotonous streets.

It may be said that if you increase suburban life you do as much harm as by enlarging a town. But, certainly, if you take the wives and children belonging to a community away from the city and into the suburbs, you are doing them good from an hygienic point of view. The husbands and fathers will have the advantage of spending their nights and their Sundays in purer air, and the disadvantage of, perhaps, journeys in a train twice or more on every week, day. But London and the large towns *will* increase, and the only question to be settled is—Are they to increase from outside inwards, or from inside outwards? [By the help of two diagrams the advantage was illustrated of making from within outwards such extensions of towns as were inevitable, rather than from without inwards by continually increasing the density of the population.] There are, perhaps, the author continued, advantages in either system; but the advantages in the second, from a healthful point of view, if not from an artistic one, outbalance, in my opinion, those of the first. It may be said, however, that the plans are too fanciful to be of any use; that suburbs always grow in accordance with local need and local possibilities; and that a town built in a pattern, and only allowed to grow in a pattern, would be impossible and undesirable. But I am speaking theoretically, and I wish my theory to be illustrated in a purely systematic way. The second plan, if carried out, would involve a cessation of building immediately adjoining the original centre, and this is what is most needed. In other words, a town that has reached a certain size should grow no more, except from centres at a given distance outside. I am not speaking of a plan suitable for time and eternity, or to be carried out by generations far ahead of our own. They will need other and much more far-reaching reforms in building if the population continues steadily to increase. I am speaking of something that is needed at the present time, and of a plan that might now be adopted in several of the larger towns in England. To take the metropolis as an example: it is not so likely to hurt London that Wimbledon or Tottenham should grow to great proportions. What does hurt London is, that all the fields of Fulham and Deptford are being covered with houses. It is the increase at the centre that is so detrimental—the gradual annihilation of the remaining open space which is close to, or forms part of, the rowns. The increase should be in the suburbs of a town, or, rather in a certain number of them whose centres are beyond a given distance from the city. This need not produce a monotonous sameness. There would soon be characteristic differences in the various suburban districts. There would be the aristocratic suburb, joined to the town by a handsome drive and a Rotten-row; the commercial suburb, with its service of city trains running every hour, half-hour, or minute, if need be; the artistic suburb, selectly free from the incursions of the railway director, where the linnet and the lily would flourish undisturbed; the domestic suburb, arranged for schools and kindergartens, nurses and perambulators; the cheap suburb, very noisy, and connected with the city by tram-lines and subways; and there might be, but we should hope that there would not be, the cheap and nasty suburb, complete in itself, in its dirt and in its degradation. But each, if not allowed to grow at the city end, but only at the end furthest removed from the town, would share alike in possessing vast strips of open land for the recreation of the people and their children.

In the towns themselves there should be every effort made to have beautiful streets, with trees and seats in them, and beds of flowers, instead of neglected and dirty corners, and creepers planted on bare walls. Every disused graveyard and deserted enclosure should become a bright garden, and every plot of unused land be made into a children's playground or an outdoor café.

If the preservation of open spaces were properly taken in hand and systematically carried out, there would not be so much need as there is now for increasing the facilities for taking people from the towns into the country. But still it will always be of great advantage, both to young and old, to see new places and breathe different air; to visit the seaside and the rural country. The railway companies have done much of late years to render this possible to a greater number by issuing cheap "fortnightly" tickets for the seaside, &c., and there is more than one useful society at work giving country holidays to city children, and sending the tired seamstress and overworked clerk to breathe the sea air; besides numberless private people who are doing their best to supply this need by throwing open their own country houses, or paying for the holidays of those who are less blest than they are with this world's goods. This is a question which is not so easily dealt with officially; it is one which, although very important, must be left more or less to be settled by the railway companies and by the people themselves. Something may be done to teach the inhabitants of the towns how best to make use of their holidays, especially the bank-holidays. But, after all, they will please themselves, and some will go to Epping Forest, while others will sit in the nearest tavern and drink, and drink, and drink; and, amongst those who are in Epping Forest, there will be some who feast their eyes on the beautiful trees and tender grass, while others will care for little beyond the ginger-beer and sticky sweets.

It must always be remembered, in speaking of the open-space question, that it is not one which, having been fully dealt with, may now be put aside as settled. On the contrary, the need of providing open spaces increases daily, while the difficulty of finding them does not diminish. It would be a great boon if a new Building Act were passed forcing builders to provide recreation grounds, or to reserve breathing spaces for a fixed number of new houses. So long as the population grows, so long will new public and domestic buildings be erected, and so long will there have to be voluntary action, if there is not State-directed action, to preserve or to provide open spaces for those who increase and multiply in the land. One word more. The work must be done well. It is better to have small recreation grounds, preserving their rural foliage and beauty, than to have large parks, stiff, flat, bare, and uninteresting. We want large and small open spaces, but natural ones; country left in the town so that the townsfolk may not forget the country.

Mr. Wm. White, F.S.A., said he did not quite agree with the writer of the paper in proposing to separate into classes the inhabitants of the suburbs. We wanted rather to distribute than to separate. We ought to have persons of all classes living in the same locality, and not thrust the poor to a distance. They would, it was to be hoped, be elevated by proximity to the other classes. Commercial considerations might necessitate a greater amount of separation in the city.

The Earl of Meath said he wished to be allowed to explain that the paper had been misunderstood by Mr. White; the writer did not mean to advocate any such separation of classes as Mr. White referred to.

Mr. Rogers Field wished to suggest that all

open spaces should be connected by boulevards or park roads. He had not been aware that that had been done already in Chicago. He remembered that in his very early days there was an opportunity of making a magnificent boulevard between Regent's-park and Hampstead-heath. The idea had been suggested by the late Professor Cochrane in about 1851, and the plan was published in the *Builder* newspaper. The outbreak of the Crimean War had interfered with the carrying out of the plan. Then, between Primrose-hill and Hampstead-heath there had been a fine avenue of trees. This avenue, which was still in existence, —Belsize-avenue,—could have been obtained at an exceedingly reasonable rate, and plans had been made showing how that avenue could be turned into a magnificent drive from Primrose-hill to Hampstead-heath. Now, however, unfortunately, the whole space was built over, and there was no means of connecting these two open spaces. This was a question to which the greatest attention should be paid. He happened to know the case he had cited intimately, but no doubt there were other cases round London where building was going on, and where the connexion between open spaces should be attended to.

Mr. H. H. Collins said that in this matter as in so many others, Queen Elizabeth was right when she endeavoured to put a stop to the building of more houses in London. The builders could not be expected to help in the multiplication of open spaces, but the owners of land might be induced to do it because it could be shown to be in their own interests. They could not get the necessary means from the ratepayers, and he would rather depend upon philanthropy than upon State aid. They could not prevent landlords from selling their land, but they could be shown, as had been seen in the very district where Mr. Rogers Field lived at Fitzjohn's-avenue, that an apparent sacrifice of land often increased the value of it.

Dr. J. F. J. Sykes (one of the Hon. Secretaries to the Section) said he recalled a circumstance that had happened a very few years ago, and which did not go far to show the greater "enlightenment of our rulers," to which reference had been made. Mr. John Leighton had made a plan, according to which the connexion mentioned by Mr. Rogers Field could have been made even three or four years ago. He referred to Eaton Fields, on the other side of Primrose-hill, which, however, had been covered since the "enlightenment of our rulers." Such enlightenment was certainly advancing at a small pace. A great deal of gratitude we owed to the ignorance,—or possibly enlightenment,—of those people who, by using large open places in the middle of London, had kept the same from the grasp of the builder. In all probability posterity, if we took to cremation, would have no occasion to bless us from a similar point of view.

Mr. B. Johnson (of the Poplar Board of Works) thought that, in order to prevent land being so built upon that nothing could be seen of the natural beauties of a locality, power should be given to local authorities to prevent more than a certain number of houses being put upon a plot. The necessity of such restraining powers being given was well illustrated in the Isle of Dogs, where men were allowed to go down 8 ft. or 9 ft. underground with the lower floors of houses, and where many families were living literally underground. Until County Councils and local authorities had such powers they would never be able to prevent land being covered by houses built like tea-chests, nor to stop jerry-building.

Dr. Engel R. L. Gould, of the U.S. Department of Labour, Washington, cited statistics which showed that London held the twentieth position with regard to its open spaces, measured in the number of inhabitants per acre. Vienna had a population of 473 per acre, Paris 495, Brussels 637, while London had 694. The Earl of Meath appeared to be in favour of small instead of large spaces. He found that London took higher rank when the larger parks were left out of the reckoning. Without the great parks, London had a population of 909 per acre; but Philadelphia, which had a population of over 1,000,000, and had only 340 per acre on the average, had 17,649 per acre when its greatest park was left out, and Vienna would have 3,300 per acre with one great park left out.

Dr. Gladstone, F.R.S., having addressed a few remarks to the audience, which were scarcely audible, Sir Arthur Blomfield said a few words, and the discussion closed with a vote of thanks to the author of the paper.

Hygienic Principles for the Extension and Internal Improvement of Towns.

Herr J. Stübben, the City Architect of Cologne, next read a paper in German on the Hygienic Principles for the Extension and Internal Improvement of Towns, of which the following is a translation:—

The subject of my paper is so extensive that it is impossible to survey the whole of it in the space of fifteen minutes, which your rules lay down for the duration of papers. I shall, therefore, confine myself to general principles. In the "Abstracts" which I have furnished to illustrate my paper, I have attempted to classify the hygienic conditions for the extension of towns in six divisions as per details under the letter B, viz.: (1) Sufficient width and useful direction of the streets, and the proper construction of the same; (2) the planting of trees in the streets; (3) cleanliness of the streets; (4) proper provision for the supply of water and lighting; (5) the production of suitable building plots in sufficient quantities and quality; (6) the hygienic arrangement of buildings, work-rooms, and dwellings.

In order to fulfil these conditions, a number of positive and negative measures of both a private and official character is necessary. I do not propose to deal with private measures at all, whilst the official measures are referred to under C and D as positive and negative, or repressive, measures. The former should be (1) establishing a comprehensive building plan, (2) a uniform project for the improvement of traffic, (3) the provision of streets and open spaces in the event of private enterprise not providing enough building land to meet the demand, (4) the acquisition of land for dwellings for the lower classes which may be unsuitable for other purposes, and (5) police regulations for the hygenic condition of the exterior and interior of buildings. The repressive measures I advocate are (1) forbidding buildings being erected contrary to the official building plan, (2) forbidding the erection of buildings in unfinished streets, (3) forbidding the following of trades within the town which interfere with public health, (4) forbidding the occupation of unhealthy dwellings and over-crowding.

I propose to go into three of these points, viz., the planting of streets, the provision of building plots sufficient in number and quantity on the part of the local authorities, and the laws relating to hygienic building and dwellings.

There are two kinds of public planting, namely, the provision of parks and the planting of trees and gardens in streets and open spaces. Public parks have received special care in England, Scotland, and North America, teaching us many a good lesson. Italy, too, possesses a great number of public gardens of great extent; but streets and open spaces are much less provided with trees in those countries than in France, Belgium, Germany, and Austria. Foreigners are struck by the fact of the streets of London being bare, whilst parks have received much attention and care. In that respect we can learn most from France and Belgium. Germany has latterly endeavoured to do more for the embellishment of parks and streets. French park-gardeners indulge in tree planting, ornamental shrubs, grottoes and flowers, but very little in shorn lawn, whilst England gives preference to the latter, to the disadvantage of trees and shrubs. Also, in this respect, Germany and Austria endeavour to keep the middle course between both extremes by uniting on their small spaces the advantages of both English and French proclivities. I say "small spaces," seeing that there is no question of so large a space, for instance, as your Hyde Park. English recreation grounds, such as those reserved for the use of school children, serve us as excellent models. In 1889 there were twenty-eight such recreation grounds in London, nine in Birmingham, seven in Bradford, and I do not doubt that they have since been increased.

Monceau, near Paris, is remarkable from a hygienic point of view from the fact of the houses being grouped around a park with entrances into the same. Dresden (Blasewitz Park) and Cologne are about to effect the same arrangement. I am of opinion that as a minimum, 5 per cent. of the area of the town proper should be reserved for public parks, another 5 per cent. for planting trees in streets and open spaces, and the remaining 90 per cent. should give 60 per cent. to dwellings and 30 per cent. to streets. These figures are not taken at random, but are based upon the plans of German cities, and will be acted upon in the extension of Cologne.

The next point is the provision of building plots by the local authorities and the State. The chief reason of the want of dwellings in towns is the exorbitant rise in the value of landed property, but inasmuch as these prices can be and are regulated under the law of supply and demand, the best means of counteracting this tendency is to extend the official building plan to the fields in the outskirts of the towns. These plots must be arranged in a useful manner as regards shape, size, and position. The probable requirements of say twenty years, or approximately twice our present population, should be taken as a basis. Private enterprise may purposely hold back in throwing such land upon the market, and it is therefore the duty of the authorities to do so, the more so as it will not do slowly to follow the existing demand, but the supply should be actually ahead of it.

The useful division of a building plot is of great importance. Supposing a plot is divided in irregular sections, there will be some corners left which are absolutely useless unless the owners can be brought to agree to a different division. If that should prove impossible, the consequence will probably be that notwithstanding the absolute unfitness of the said corners, houses will after all be built upon them, which is a disadvantageous proceeding from an architectural, hygienic, and economical point of view. Thus, in our extension works in Cologne we have had to wait for ten years in a particular case before the owners of a plot became reasonable enough to modify the shape of their plot into a useful one. Of course, the obstinacy of a single owner is sufficient to prevent the modification of an entire plot, although, on the other hand, his own advantage may lead him to act in this manner. In such cases I propose that the authorities should have the right of forcing the owner into submission.

Coming to the last point I wish to put before you, viz, the police protection of hygienic laws, I need only say that the builder does not build houses for himself, but for those who are to live in them, and for this reason there should be laws empowering the police to interfere when necessary. We require hygenic building laws, and hygienic dwelling laws. The former regulate the relations between buildings and building plots, and the latter deal with the interior arrangement of dwelling-houses, both acting from a hygienic point of view. The best method of building would, of course, be to admit light and air from all sides, but that is not always practicable. For hospitals and similar sanitary institutions, however, this point should be made a legal requirement. In private houses, gardens in front and rear fulfil this condition to a certain extent. The German Hygienic Society are engaged upon working out an Act of Parliament to be introduced shortly, and thus hygienic building legislation may be shortly expected in England as well as in Germany and France. If a house cannot be turned into a healthy and satisfactory one, it must be pulled down, and if necessary a whole row of houses must be treated accordingly. France and England possess laws to that effect, but they have, so far, not answered their purpose. All these repressive measures only become practicable after a sufficient number of good dwellings have been provided for, and from this it follows that it is the duty of the State to facilitate the erection of artisans' dwellings, the construction of new streets, and the improvement of traffic. But there are also objections to State interference of this kind. The building of houses is a matter for capitalists and private enterprise, generally speaking. But time prevents me from saying more on this subject, and, in conclusion, I would urge the following two sentences upon all persons who are interested in hygienic legislation, viz.: 1. "*Salus publica suprema lex*," and 2. "The home for the people."

Mr. John Slater said that so large a subject could not be disposed of in fifteen minutes. There was matter sufficient for the whole

sitting, and even for an adjourned discussion. The great difficulty in London was its enormous size. The distances in Continental cities were as nothing to those in London. Nearly all the Continental cities, too, had been fortified, and the disused fortifications could be best utilised now by turning them into boulevards and open spaces. Herr Stübben had rendered good service by advocating a regulation to restrict the height of buildings in narrow thoroughfares. Even we in London moved far too slowly in this respect. Herr Stübben was entitled to our warmest thanks for coming here to tell us what was being done abroad for the extension and internal improvement of towns.

Mr. Rogers Field said he agreed that the work done by Herr Stübben in bringing this question before the meeting was of great value, and would be of advantage to us. By-laws for the regulation of buildings and drainage had been of the greatest utility, but he very much questioned whether the regulations relating to houses were scientific. In the little town of Uppingham he had seen a good deal of the working of such regulations from the beginning, and he found quite as much indirect advantage from them in the education of the public mind on sanitary questions as of direct advantage. It was often urged that by-laws might be serviceable for new buildings, but how about the old ones? The answer suggested by his experience was that if once the principle were adopted by the people generally it would be applied by them to old buildings as well as new. If people saw it was to their advantage they would make the regulations apply to both.

Mr. Thomas Blashill, Superintending Architect to the London County Council, said he should like to make a remark or two, suggested rather by the discussion than by the paper, which he had not been able very well to follow, but which would be of the greatest value to him when printed. He regretted the tendency to consider the question as too large a one to be effectively dealt with. It was considered by many people not possible to make an old town perfectly habitable. The question had been taken up by faddists and persons not experienced, which accounted for their failure to find the solution. If approached in a scientific spirit, and backed by sufficient funds, there was no reason to despair of a practical solution of the problem being found.

Herr Ludwig Lechner, Baudirektor der Stadt, Budapest, complimented Herr Stübben upon the excellent way in which he had placed his subject before the Congress, and said there was no doubt that most of the features Mr. Stübben had introduced into Cologne could with advantage be imitated by most other towns, perhaps in a slightly altered shape. But some of his proposals depended upon climate, position, and the past history of each town. For instance, certain parts of a town might at one time have played an important rôle, and afterwards lost such importance, partly or wholly owing to the extension of the town. Then hygienic arrangements were more difficult and expensive in old-fashioned parts than in places where houses could from the first be built upon modern ideas. The best plan was, no doubt, as they had done in France, to pull down the old town and build an entirely new one in its place; but otherwise any such improvements could only be effected very slowly. With reference to the proposed interference of the authorities with the property of owners, that constituted a violation of private rights and privileges which interested parties would in many cases object to. These forcible measures were not altogether pleasant, and were apt to excite a whole population. The fact of there being more trees in some places and more lawns in others, was explained to a great extent by the different climate. He came from a southern county, where experiments in that direction had been made. But though they had plenty of sunshine, there was occasionally an absence of rain for four, six, or even eight weeks, which precluded the possibility of keeping lawns in good condition, whilst shrubs and trees could be better cultivated. He agreed with Mr. Stübben in thinking that the high prices for property could, and should, be counteracted by increasing the supply, although even to that objections could be raised, inasmuch as it interfered with private enterprise. Gas and water could not be introduced everywhere except at a very great expense, unless it was done when the streets were originally constructed.

The Chairman, in closing the discussion, tendered the thanks of the section to Herr Stübben for his valuable paper.

The Hygiene of Groups of Dwellings at Low Rentals.

Monsieur Charles Lucas, architect (Paris), next addressed the section in French on the above-named subject. He had not prepared a paper for the present Congress, but the progress made in various countries on the continent of Europe for the realisation of hygienic conditions in the construction of groups of dwellings at low rentals was described. The subject, as presented by Mons. Lucas in a twofold aspect, had considerable interest and novelty as well as importance. The dwellings under consideration were mainly of two types. First, small houses isolated or in groups for not more than two families, each house having its own little garden; and, second, industrial dwellings suitable for large towns, which might be of several stories or in flats. In sketching the history of the movement, M. Lucas placed first in order of date a seaside fishing village in Denmark. He next referred to some temporary habitations erected in Portugal to shelter the multitudes rendered homeless by an earthquake, and used later to shelter other multitudes rendered destitute by the destruction of the silkworm. In Italy the most important experiment of this nature was the construction of the Albergo in Naples, which accommodated 2,000 persons. As early as 1810 a commencement was made in Belgium in a movement which has since taken a very wide extension in that country—namely, the provision of groups of dwellings for workmen by their employers. The earliest type of the isolated house was created by the industrial firm of Dolfus of Mulhouse. Here at a very low rental a house is provided healthy, and salubrious, standing in its own garden-plot, the capital expended producing a revenue of 5 per cent. In England they had an example of the same kind in the model designed by the late Prince Consort. Experiments more or less complete of the same nature have been instituted at the Creusot works by the family of Schneider, at Havre, at the familistère of Guise by Mons. Godin, and in Paris, especially at Belleville. All these efforts, whether devoted to a project on a grand scale or to single model dwellings, had demanded an immense amount of study. It was necessary to ascertain by a special study the hygienic condition under which houses of this class can be grouped together, as well as the general study which is necessary to be devoted to the construction of suitable houses for working families at a rent within the means of the poorest. By no public body had the difficulties of the problem been better comprehended than by La Société Française des Habitations à Bon Marché. The society had not lost sight of the moral side of the question, nor overlooked the possibility of giving the charm of picturesqueness to the groups of houses, and they had above all considered every available means of securing economy in the construction, and in the combination of two or more of these dwellings into one group. The society had carefully considered the subject, not only with respect to single buildings, but with regard to the laying-out and extension of groups into towns. The preservation of sufficient open spaces, the alignment of the streets, and the particular use to which the different classes of dwellings were to be put, had obtained the most careful study. Where the groups are numerous, it is necessary to have public buildings reserved for the inhabitants of the industrial quarter. The difficulties of the problem had decided the society to open a competition with prizes for the best projects, to be submitted to a jury of fifteen members of the society. They offered four prizes—First, a gold medal, value 3,000 fr., as a grand prix; second, a silver medal, value 1,000 fr.; third, two silver medals of 500 fr., and fourth, honourable mentions, with the society's gold medal. The competition would be in three parts:—First, the enquiry; second, the technical plan; third, the financial arrangements. The winner of the gold medal must have satisfactorily treated the problem in each of its three branches. The speaker said he had been charged with the duty of presenting the question to the next Congress and, thanks to the good work already done by the French Society to which he had the honour to belong, he was enabled to present to the President a project for a competition, which he would in the interval be able to further develope. They found that the different classes of workmen to be accommodated required at least two distinct types of construction. Take, in one class, the town of St. Denis, near Paris, in which many thousands of workmen constantly resided, but where also the number of workmen greatly varied, according to the varying circumstances of the industries they followed. They had to house at one period of the year more by many thousands than at another period, the less permanent residents having consequently to be provided for in furnished apartments. These conditions could be best fulfilled by blocks of buildings with several floors, resembling those blocks of dwellings familiar in England, with whose construction Paris had been made acquainted by M. Georges Picot, of the Institute. In the case of a married workman who had a young family, moral considerations came in to prescribe a dwelling of the other type, which he would call the Mulhousian. The two types were found side by side at St. Denis, but there were objections to that arrangement on the score of morality. It was not advisable that little children should too readily cross the path of strange workmen, perhaps unmarried, perhaps not even Frenchmen. And from the artistic point of view it was undesirable to group together types so incompatible on the same site. In presenting to the President a copy of the programe for the competition instituted by the French society for dwellings at a low rental, M. Charles Lucas asked in conclusion whether there was not in the grouping and in the two types he had suggested some little novelty, and whether there was not reason to hope that it would form an interesting feature of the proceedings of the next Congress (much applause).

Mr. H. H. Collins, in opening the discussion accorded praise to the author, but at the same time pointed out that, more than twenty-five years ago, the subject had caught the attention of the late Mr. George Godwin, and the true conditions of the question had been very thoroughly thrashed out. In the *Builder* a very able scheme was proposed and worked out by him for providing dwellings for artisans and workmen. He (the speaker) had built a great many dwellings of that class, and in his opinion it was cruel to build great barracks for artisans. A little old woman once gave him a very practical reason for condemning high blocks. "I am seventy years of age, but I have always lived in a comfortable little cottage. I could never live up there, 70 or 80 ft. high. If I wanted a ha'porth of milk, I should have to come all the way down for it." It was a question of the value of sites. If you had to pay 3d. per foot you would be compelled to build to a great height; but if the price of the site was not more than ½d. per foot a reasonable limit to the number of stories might be attained. Mons. Lucas was right with regard to many points, and the paper he had contributed would be studied when it appeared in the Transactions of the Congress.

The President, Sir A. Blomfield, pointed out the danger of drifting in the discussion into a question which would come before the section on Thursday. The question was "The Hygiene of Dwellings at Low Rental."

Mr. Wm. White said the question of rent must always depend on the value of land, and whatever could be done to get land at a lower price should be within the question.

Mr. H. H. Statham referred to a point not hitherto touched upon, the spacing between blocks of dwellings. The building of high blocks in order to make the most of the value of the ground, unless the buildings were spaced proportionally farther apart, was just as much overcrowding as cramming people together in lower buildings in narrow streets. Moreover, the high buildings, unless far enough apart, shut out the sunlight from each other. Light was most important, and in some collections of blocks in London this consideration had been flagrantly neglected.

The President said they must all feel obliged to Monsieur Lucas for the paper, which had called forth a good discussion, although it might perhaps have been extended with advantage.

[*Continued on page* 125.]

Illustrations.

DESIGN FOR COMPLETION OF SOUTH KENSINGTON MUSEUM.

WE give this week the exterior perspective and the interior view of the Central Hall of Mr. Aston Webb's fine design for the completion of the South Kensington Museum buildings, which has been selected for execution, as before stated. The following extracts from the Report which accompanied the design will best explain the architect's intention:—

"The general plan is laid out square with the later portions of the existing building, viz.,—the libraries and architectural courts, and by this means the awkwardness of an obtuse angle at the south-west corner (the principal point of view) is avoided, and a symmetrical building is obtained, as seems most fitting to so important a work.

With a façade of so great a length and a recessed centre, as suggested by the conditions, it becomes imperative to strongly mark the central entrance by a feature which shall dominate and give unity to the whole, and bearing in mind the coupled towers of the Natural History Museum, and the lofty single tower of the Imperial Institute, I have elected to mark the centre of my design also with a tower which would hold its own with its neighbours, and by its varied design would, I believe, group well with them, and assist to form a crown of towers almost unique in Europe. Without some such feature, it is felt that the Museum would be lost and crushed by its surroundings, and taking into account the vast size of the building when completed, this tower, which is by no means excessive in height, may be considered only what is reasonably necessary for moderate architectural display. The angle pavilions are covered with domes as an effective contrast to the two buildings already mentioned, and by these permanent coverings would lend a monumental character to the building. In order to secure the full effect of the façade, the offices have been grouped with the main building.

The new buildings are designed to harmonise with the existing portion, and how far they do so can be seen on the drawings; but no attempt has been made to reproduce precisely their style, as this would probably lead to disappointment in the result. The style selected would, it is thought, lend itself to the large window openings necessary for the purposes of such a building, and afford a field for a refined scheme of ornamentation and sculptural embellishment, some suggestion of which is shown on the detail, and which would be in keeping on a museum of this character.

The perspective is set up on the exact lines laid down in the instructions, though a view more in front would have displayed it better. The adjoining buildings are also accurately set up, both as to size and position, the Oratory being shown as proposed to be completed.

Care has been taken in designing the general outline of the building to consider its effect in conjunction with the Natural History Museum, and a diagram has been prepared showing their relative outlines. The towers are practically of the same height, and the main ridge and pavilions are also very similar, thus neither building would dwarf or interfere with the other, while the change of outline from the steep roofs of the Natural History Museum to the domes and lantern of my design would afford the necessary variety for the effective grouping of the two buildings.

The time at my disposal has prevented my working out the interior view as fully as I intended.

Time has prevented me submitting a bay, tinted to show the proposed scheme of colour, and it would be difficult to do this without showing the greater part of the building. My suggestion is that the pavilion-ends and the towers should have red brick freely introduced, with buff terra-cotta terminations, in all cases the junction of the two being merged by a stage of bandedbrick and terra-cotta, the remainder of the building being in buff terra-cotta.

Plan.

Great simplicity of all the main lines has been aimed at, and a symmetrical plan provided.

The great central entrance under the tower, with cloak-rooms, &c., on either side, leads into a large central hall shown in the interior perspective view. This hall would also be available for the European exhibits, and at the upper end is situated the grand staircase leading direct to the libraries. It is suggested that the magnificent marble screen now used as the entrance in the architectural court might be again utilised in this hall, and it is so shown on the drawings. Branching right and left of this entrance hall are the top-lighted European courts, through which on the west access is gained to the Oriental courts and galleries, and on the east to the department of students work, and also to the existing portions of the Museum.

Staircases also lead out of this hall to the galleries on the two floors; over and under the library stairs access is obtained to lavatories, &c., for both sexes. At this end also are the additions to the library accommodation and the book store. Staircases are provided at the termination of all the main axial lines of the building, where they are readily accessible and easily seen, secondary stairs being also provided for the librarians, officials, workpeople, &c.

Another public entrance at the north-west of the site is also provided in connexion with the present subway. This entrance is formed by an extension of the present Fabric Gallery to Exhibition-road, and by the removal of the present library staircases, which would no longer be required, a good direct entrance is obtained to the existing portions of the building. From this entrance direct access is also to be obtained to the Oriental Museum.

The portion of the site north of this entrance, between the present Science schools and the Museum, it is not proposed to build upon above the basement, this forming a severance between the Schools and the Museum, which will be of value in the admission of light and air to the residences. The architectural continuity of the two buildings is maintained by the suggested stone screen.

At the eastern end of the site are the offices for the staff and department in connexion with the present ones, the principal rooms all facing the Cromwell-road, with smaller ones in the rear, looking into well-lighted courts. The corridors are well lighted, with staircases at either end, and passenger lift to the three floors. The principal entrance to these offices is from the angle of the recessed portion of the main front, with a second one near the present entrance.

The carriage entrance at the extreme east of the site leads into a van-yard for the delivery of students' work, with a direct entrance into the packing room, and from thence into the space allotted for the examination and exhibition of the students work as required. This examination space, though available for European exhibits, is so arranged as to be easily shut off for the students' purposes.

Two service entrances are provided, one at the east, from the yard just referred to, and the other at the west, from the open space opposite the residences. Each have large lifts adjoining to raise the exhibits to the various floors. A passenger-lift is also provided in one angle of tower to take visitors to the galleries on top floor when unable to walk.

The first floor is occupied with European and Oriental galleries and offices, with a further mezzanine floor of offices in the eastern block. The top floor is occupied entirely with Oriental and European top-lighted galleries, the latter extending on this floor over the offices.

It is proposed to make a feature of the domed pavilions on the second floor, which, on the Oriental side, would be finished as Arab halls, with domed ceilings, forming an appropriate setting for the exhibits. The roof over the Oriental court, in iron and glass, would also be domed and treated in a manner to suggest its appropriateness.

The general design of the Oriental galleries has been taken from those in which the collection is now housed, and which have been found so satisfactory by the authorities, the width being increased to 32 ft., which it is thought would be an improvement, and would exactly and conveniently take present cases.

The European galleries are shown of a less width, but these could be increased if thought desirable without alteration in the plan.

The large wall-space in the Oriental court is especially designed for the large architectural exhibits which will have to be displayed in it. . . .

The basement is laid out for storage, the floors above being carried where possible on iron columns, and the day-lighted rooms being allotted to workshops and offices. The basement generally is 12 ft. high.

The boiler-room space for electric-light plant and engineers' accommodation is at the extreme north-west of the site.

The refreshment-rooms and kitchens for the officials are placed under the offices at the south-east.

Care has been taken throughout to connect the new buildings to the old in as natural a manner as possible.

The building it is intended to face throughout with red brick and buff terra-cotta to correspond with the schools.

The entrance-hall would also be in buff terra-cotta, and the remainder of the internal dressings in light glazed faïence.

The floors would be fireproof throughout.

The walls of the courts and galleries have been purposely left without architectural embellishments, and would be lined with matched boarding for easy fastening of exhibits thereto.

Ample spaces have also been provided for decorative painting and sculpture in the future.

Great care has been taken to secure as perfect lighting as possible, and with this view all double glass roofs or skylights have been avoided except in the case of the Central Hall, where a barrel glass roof, somewhat similar to the architectural courts, has been adopted, light being also largely obtained from the clearstory windows and dome.

The top-lighted galleries, as already mentioned, are lighted throughout in a similar manner to the top-lighted galleries of the present Indian Museum, admittedly the best-lighted galleries in London.

The side-lighted galleries are mainly lighted from one side only, the opposite wall being left plain for exhibition purposes; but this could be pierced where desired, and additional light obtained from the courts, though this is not considered necessary.

The greatest amount of window space possible has been obtained on the one side, the windows on the ground floor being square-headed, and carried close up to the ceiling; those on the first floor, where the light will be ample, being semicircular-headed.

No galleries obtain their light only from the top-lighted courts, as such galleries are found most unsuitable for exhibition purposes in the present building."

The total cost of the buildings is estimated by the architect at about 420,000*l.*

ARCHITECTURAL ASSOCIATION EXCURSION: PLACES VISITED.

THE two pages of lithographs represent buildings visited by the Architectural Association during their annual excursion this week, and will be found referred to in the account of the excursion either this week or in the continuation of the account in our next issue.

The illustrations of the Market Hall, Shrewsbury, and of Ireland's Mansions and old houses, Frankwell, Shrewsbury, are from photographs by Mr. Valentine; those of Condover Hall, Pitchford Hall, and Buildwas Abbey, from photographs by Mr. Eddowes; that of the Feathers Hotel from a photograph by Mr. Frith; and that of Much Wenlock Abbey from a photograph by Messrs. Mansell & Co.

COMPETITIONS.

NEW CHURCH, YEOFORD.—The committee appointed in connexion with the scheme for erecting a new church at Yeoford have met and passed the plans of Mr. Oliver, of Barnstaple. The church will be of stucco and rubble, with an iron roof. It has been decided to add a bell-turret and a gable cross.

THE ART GALLERY SCHEME FOR GLASGOW—On the 7th inst. a meeting was held of the Executive Committee of the Association for the Promotion of Art and Music in Glasgow. Sir James King presided. It was reported that the minimum sum of 46,000*l.* required under the contract with the Exhibition Association and the Corporation had been raised. This amount, it was stated, had been received from forty-three subscribers. The Executive Committee discussed the method which should be followed in obtaining a design for the new galleries. It was resolved that there should be a double competition, and that in the first instance all architects who chose to do so should be asked to compete. Out of the designs sent in at least five would be selected, and the authors invited to furnish completed plans and drawings, one of which would be selected. Mr. Alfred Waterhouse, R.A., was appointed assessor to guide the committee in the various steps they have to take both in framing instructions for the competition and in finally selecting a plan. It was remitted to Mr. Waterhouse, along with Mr. Macdonald, the City Engineer, and Mr. Paton, the curator of the Corporation Galleries, to adjust, on the basis of the report approved, the conditions of the competition and the instructions to the architects. These will be printed and submitted to a meeting of the executive to be held on Monday, August 24.

NEW REREDOS AT THE PARISH CHURCH, WORDSLEY.—Mrs. Edward Webb, of Summerhill House, Kingswinford, has presented a reredos to the parish church at Wordsley. The reredos is 24 ft. wide. The centre division is of alabaster. The chief feature of the design is immediately over the Communion table,—a large panel, containing a modelled group, the subject being "The Adoration of the Magi." This panel, as well as the angels in the niches, are sculptured out of white alabaster. The surrounding portion is worked out of veined alabaster, the top being canopied with battlemented cornices and bratticing. The other divisions, forming wings to the centre, consist of four carved canopies on the left-hand side, containing figures of St. Gregory, St. Augustine, Bishop Theodore, and St. Chad, and four similar canopies on the right-hand side, containing figures of St. Hubert, St. George, St. Martin, and St. Maurice. These side-wings are worked out of Caen stone. The general design and details are the work of Mr. J. A. Chatwin, of Birmingham, and the modelling, sculpture, and carving have been executed by Mr. R. Bridgeman, of Lichfield. Miss Roose and Miss Richardson have also presented a stained-glass window to the church.

SEVENTH INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.

[Continued from page 123, *ante*.]

The Control of the Construction of Dwelling Houses.

Mr. Thomas Blashill, F.R.I.B.A., Superintending Architect to the London County Council, next read the following paper on the above-named subject:—

The right and the duty of the public authority to make and to enforce regulations for the construction of habitable buildings, with proper regard to their healthy occupation, has been recognised in this country by many special Acts of Parliament affecting the metropolis and our larger towns, and also by the Public Health Act, which is applicable wherever the density of a population renders such regulations necessary. The laws of other countries generally recognise the same right and duty.

The chief structural conditions of a habitable building which are recognised as being necessary for its healthy occupation are these:—

1. It must stand upon a site the subsoil of which is naturally dry, or is properly drained and free from impurity; and effective means must be taken to prevent the admission of air from the soil into the building.

2. The building materials,—particularly the bricks, the mortar, and the plaster of the walls,—must be of good quality, so that neither moisture nor impure air can be admitted through them into the building, and means must be taken to prevent the moisture from the ground rising up the walls.

3. All parts of the building, and not merely those parts which are actually inhabited, must be properly ventilated and lighted, the habitable rooms being of sufficient size and particularly of sufficient height.

4. Provision must be made for the removal of refuse, whether solid or liquid, from the building, and from its near neighbourhood, before the refuse begins to pollute the air.

In order to show how these matters have been dealt with by law, I will, in the first place, give the regulations which are now in force in London and applicable to each of these necessary structural alterations.

The Metropolitan Buildings Act and the Metropolis Local Management Act were passed in 1855, and have been since amended by several Acts, some of which give to the London County Council a limited power of making by-laws. So far as these Acts and by-laws relate to buildings, they are chiefly intended to provide for the sound construction of walls and the prevention of fires. The regulations that relate to health as affected by construction are few and not very efficient for their purpose.

As regards the sites of buildings, the by-laws made under the amendment Act of 1878 require that they shall be cleared of any material impregnated or mixed with fœcal, animal, or vegetable matter, dust, or slop, or other refuse with which they have been filled up or covered, and the holes thus formed must be filled up with "hard brick or dry rubbish." The Amendment Act of 1890 empowers the Council to make by-laws regulating the mode in which any excavation made within 3 ft. of a building shall be filled up. The object is to clear the site from impurity, but when I say that the existing by-laws were found insufficient to prevent the erection of houses upon a disused cemetery filled up by interments, some idea may be formed of the difficulties that beset the makers of regulations for sanitary purposes. Under the Public Health Act, 1875, certain by-laws have been framed by the Local Government Board applicable to the cases of urban and rural sanitary authorities, and these are generally adopted outside the metropolis, with or without modifications sanctioned by that Board. The new by-laws of the City of Manchester, approved in 1890, probably give their best and most modern form. They require, in addition to the removal of any impure material from the site, the removal of any such matter that may have been deposited upon the site, but they are silent as to the filling up of any holes left by the excavation.

The Metropolitan Regulations make no provision for the drainage of a site that is naturally damp. The Model By-laws provide that the subsoil shall be drained with earthenware field-pipes, which shall be trapped and ventilated at their junction with the foul drain of the house. In a district where much of the subsoil had been excavated for the removal of clay and gravel a by-law was approved prohibiting the erection of a building until a layer of sound and suitable material sufficient to elevate the site to an adequate height had been deposited thereon. It seems generally desirable to treat a site that is naturally damp or soaked in moisture in this way, for an ordinary field-drain is not permanently efficient, and there is no security that the trap will always prevent the passage of foul air into a porous subsoil.

The Metropolitan By-laws require that, unless a site is gravel, sand, or natural virgin soil, it shall be covered with a layer of good concrete 6 in. thick, and smoothed on the upper surface. This concrete, which is usually made with lime, is of very little practical utility, and the exceptions of certain kinds of site are very unfortunate. The Model By-laws admit of no exceptions, and require the site to be covered with asphalte or a 6-in. layer of good cement concrete rammed solid. The object being to prevent the admission of ground-air into the house, this cement concrete should be either asphalted or grouted on the surface with cement properly smoothed, as even the best concrete will allow the passage of moisture and of air. The Metropolitan By-laws are silent as to ventilation under the wooden floors of the lowest story, but the Manchester By-laws provide for a ventilated space beneath the floor timbers. I have, however, long been convinced that there ought to be no wooden floors of the ordinary construction in the lowest story of a house, and no space, ventilated or unventilated. The air-inlets are invariably stopped up to prevent cold and draughts, and, at the best, the space must be a means of introducing stagnant or ground air into the house. If brick or stone paving would be too cold, flow-boards, 1½ in. thick, Burnettised or Ryanised, may be nailed to narrow fillets embedded in the concrete about 3 ft. apart, or they may be nailed to a layer of coke breeze and cement, concrete, or the ordinary wood flooring blocks may be used. Thus the cost of excavation and of flow timbers may be saved, and a solid impervious floor obtained.

The burnt bricks and bad mortar permit the passage of moisture through walls. Mortar and plaster mixed with putrid or earthy matter increase this mischief and pollute the air. The Metropolitan Buildings Acts and By-laws demand good hard sound well-burnt bricks, and mortar composed of fresh burnt lime or cement and clean sharp sand or grit "without earthy matter." This last item is very important, for earthy matter can be easily detected by the eye and separated by analysis. The London Council General Powers Act, 1890, gives power to the Council to regulate the composition of plaster, which hitherto could be made chiefly of foul road scrapings or garden mould. The materials demanded will be generally similar to those required for mortar.

The provision of a damp course near the base of a wall is most important. The Metropolitan By-laws demand that it shall be of "asphalte or other material impervious to moisture" placed 1 ft. above the level of the ground in external walls, and 6 in. below the lowest floor in internal and party walls. Thus in external walls there is no provision against the passage of damp at the level of the ground, or below that level. The Manchester By-laws require a damp course of sheet lead of 4 lb. to the inch, asphalte ½ in. thick, or slates laid in cement, or of other material impervious to moisture beneath the lowest timbers and at the level of the surface of the ground. If the lowest floor is to be below the surface of the ground the external wall must be double, having a cavity of 2 in. between the outer and inner portions, and extending from the base of the wall to the surface of the ground with one damp course at the base of the wall and another at the top of the cavity. The Model By-laws suggest that the cavity should extend to six inches above the surface of the ground, and even that is hardly enough to provide against the splashing of rain. The least that should be demanded is an outer covering or rendering of the wall with asphalte or some effectual material carried down from the damp course which is above the ground to a damp course that is below the floor. But it would not be very unreasonable to demand that the whole of the lowest part of the wall, up to a height of twelve inches above the ground, should be built of hard bricks bedded in cement mortar, as is very usual in good work. There does not appear to be any legal authority at present for demanding a dry area, or even an external coating for the protection of the lower part of a wall, these matters not forming part of the wall.

The supply of light and fresh air to habitable rooms, and the provision of sufficient air-space may be secured by requiring that the rooms be made of adequate size, and particularly of sufficient height,—and that they have suitable windows overlooking open spaces. The Metropolitan Buildings Act, 1855, provides that unless all the rooms in a dwelling-house can be lighted and ventilated from a street or alley adjoining, it shall have in the rear or on the side an open space exclusively belonging to it, measuring 100 square or superficial feet. But it has been legally decided that the light and ventilation need not come directly from the outside, and if they are admitted through another room no open space need be provided. If the open space is provided there is no power to secure that any room shall be lighted or ventilated from it. The Amendment Act of 1882 requires that every new dwelling-house erected upon a site not previously occupied in whole or in part by a building shall have directly attached thereto, and in the rear thereof, and extending throughout its entire width, an open space of not less than 150 square feet. If the frontage exceeds 15 ft. in length, the space must measure 200 square feet, a frontage over 20 feet must have an open space of 300 square feet, and a frontage over 30 ft. must have a space of 450 square feet. But it is permitted to cover the whole of this space with building not higher than the ceiling of the ground-floor story of the main structure. In many cases this is very inadequate. The Model By-laws fix the size of the open space at a minimum of 150 square feet, but increase the area in proportion to the height and length of the house. In any case, the distance from the rear of the house across the open space must be not less than 10 ft., but if the house is 15 ft. in height the distance must be 15 ft.,—if the height is 25 ft. the distance must be 20 ft.,—and for 35 ft. or more of height the distance must be 25 ft., and these widths must be carried all along the rear of the building. These by-laws also enforce open spaces in front of dwelling-houses, and a similar result is obtained by the Metropolitan Regulations, which fixes the widths of streets and the heights of buildings. These Model By-laws also demand that every room shall have a window measuring one-tenth of the area of the floor, and one half of it must open so that the opening extends to the top. This window must overlook an open space. And if a room has no fireplace it must have a ventilating opening or shaft of 100 square inches in area. The Berlin Regulations of 1887 provide that lobbies, vestibules, and corridors that have no windows must have tubes or pipes for ventilation. It is difficult to fix by law the size of a habitable room. The Metropolitan Building Act requires that every habitable room shall be 7 ft. high in every part, except rooms in the topmost story, which must be 7 ft. high over one-half of their area. If in a basement they must have (in accordance with the Metropolis Local Management Act) 1 ft. of their height above the adjoining footway with an open area 3 ft. wide along the front.

But the building regulations adopted by the London County Council for artisans' dwellings that are built upon the land which it has to devote to that purpose indicate the views of that body as to the proper sizes of dwelling-rooms for the lowest class of the population that inhabits separate tenements. The assumption is that the average population will be two persons per room, and the standard height of rooms is to be 9 ft. A one-roomed dwelling is not to be of a less area than 144 square feet; in a two-roomed dwelling the additional room is to measure at least 96 ft. square; and in a three-roomed dwelling the third room is also to be of this size. Basement rooms are not to be sunk more than 3 ft. below the adjoining pavement, and water-closets are not to be immediately accessible from dwelling-rooms. These closets are, in those dwellings, generally so arranged with regard to the scullery that a current of air will pass to the other rooms through the scullery and not through the closet. The Model By-laws provide that the closet shall adjoin an external wall, and shall have a window measuring 2 ft. by 1 ft., also a ventilating air-brick or air-shaft; but no regulations can secure these contrivances from being stopped up by the occupiers. It is, I think, a source of evil to assume that a water-closet must be a foul place, and to trust to remedial precautions which, in practice, will

never be taken. A closet should, by its construction, be rendered so free from impure air that nothing beyond a window should be necessary to keep it sweet.

The last item I have to notice is the structural measures necessary for the removal of refuse from the house. The modern practice being to take all the liquid refuse of town houses into a public sewer, no question of cesspool construction can arise where sewers exist, and a cesspool cannot in any case be constructed in or near to a house. Questions of house drainage will be dealt with in another department of this Congress, and we have only to notice the structural means of getting liquid refuse into the drain. There are in the Metropolis no very precise regulations for that purpose, but by-laws are now under consideration. The Model By-laws require that the soil-pipe from a closet or slop-sink shall be fixed outside a house, and shall be thoroughly ventilated. The waste-pipe from a bath, lavatory, or ordinary sink must discharge outside the building over a channel leading to a trapped gully, 18 in. distant. But there is no provision for a trap under the sink, which is necessary, and there is no satisfactory provision for the trap which forms part of the closet apparatus.

An earth-closet must be lighted and ventilated, as in the case of a water-closet, but I think no earth-closet should be permitted within a building, though with proper arrangements it may be placed close to a building. Privies and ash-pits, where they are permitted, must be placed 6 ft. from a building, and 100 ft. from any source of water supply. The Model By-laws give detailed regulations as to these matters. Ash-pits (or dust-bins) for "dust, ashes, rubbish, and dry refuse," must be built of brickwork, and may contain 6 cubic ft., or such less amount as may be equal to the accumulation of one week. This is a great source of evil, for the kitchen refuse has to be mixed with it. In the City of London, which forms rather over a square mile of the metropolis, this refuse is collected daily, and no accumulation beyond one or two days ought to be permitted. I think that kitchen refuse should not be mixed with the ordinary dry refuse, such as dust, ashes, and hard-core; the mixture spoils both articles, producing a putrid mass that is unmanageable, and of little value.

I have now given the details of those structural regulations which in this country have been generally considered necessary for ensuring the healthy condition of a house, together with a few observations thereon. Had time permitted I should have been glad to compare our regulations with those in force in the chief Continental countries, some of which are very elaborate, but I hope that these will be adequately brought out during this Congress.

The structural conditions of a healthy house do not appear to be numerous, but they are exceedingly difficult to define so that they can be clearly understood and enforced by law. It ought not to be possible to build a house in which the conditions necessary to healthy occupation are violated. Indeed, this can be prevented where the Model By-laws are in operation, which forbid the occupation of a house until it has been certified to be fit for human occupation. But if this care is necessary in a new house, its necessity can hardly be disputed in the case of old houses, where the conditions are notoriously unsatisfactory. It has been proposed to bring these houses gradually under inspection by fixing a period after which the public authority will be authorised to inspect and order the amendment of defects. This is a matter which, both as to regulations and as to inspection, will demand the greatest care and caution. If it is established, it should apply to all houses without distinction of size or of the class of their occupiers, so that the whole population, the interest of which, as regards health, is common and cannot be divided, should be protected by public law from evils over which individuals can have but little control. And amongst the many sources of sickness and premature death, we should be freed from those which spring from the faulty construction of the house.

Professor Aitchison, A.R.A., characterised the regulations that had been mentioned by Mr. Blashill as emanating from the London County Council as admirable. But nobody who had much to do with building could disagree with the fact that the grand difficulty was that houses were built to live in. With regard to these sanitarily-constructed dwelling-houses, they were probably used by mechanics or persons that might be looked upon as the aristocracy of labour. But probably half the population of London did not earn more than about 10s. a week, and all these regulations, providing for sand, well-burnt bricks, mortar, best burnt lime, asphalte, and all sorts of things, were absolutely impossible, as these people could not pay the rent for such dwellings. But something must be done to render the habitation of the poor possible. He did not see what could be done unless the wages were to be raised, but that was a question of population, and at present people were willing to work at the lowest wage to prevent them starving. For the houses of the largest class of persons in large towns there was much difficulty in meeting most of these requirements, for the speculative builder knew perfectly well that his houses were useless unless they could be let at a certain price. The consequence was that every kind of bad material and bad workmanship was put into requisition. Then every attempt was made to outwit those who were appointed to see about the carrying out of the regulations.

Mr. Coard S. Pain, of Liverpool, said that the paper had raised difficulties in his mind. They were all fully acquainted with the fact that it was a greater difficulty to enforce by-laws, however excellent in themselves they might be, than to make them. All of them who had had anything to do with the superintendence of buildings—of jerry buildings, as they were usually called in the north—must know how utterly impossible it was to get the by-laws carried out if the builder was short of money or otherwise unable to do his duty. The question had perplexed him very much, but he would only make one suggestion. He thought that the official of the local authority should be jointly appointed by the Local Government Board, and the Rural or Urban sanitary authority. They all knew that the general public was utterly indifferent to what was going on. The local authorities were to a large extent composed of people directly interested in not carrying out the regulations. One might be as smart as possible, but he would back the jerry builder against the smartest. Unless one actually sat upon the job, it was impossible to compete with him; he would cheat them under their very noses, and the local authorities backed him for many reasons. One member might be the owner of a great property, or another element in the local authority was usually the speculating builder, and it was most difficult for the official, however honest he might be, to fight against these influences. That difficulty should be removed, and he thought the adoption of the suggestion he had made would remove it, the more so as another difficulty to get the by-laws carried out was the frequent inefficiency or ignorance of the official. He was referring to small communities of from 2,000 to 6,000 inhabitants, just large enough to demand the services of a sanitary official. A carpenter possessed of no particular knowledge was appointed as surveyor, and he had come across a surveyor recently who was not even acquainted with the by-laws. The law could not make a man honest, but it could ensure the appointment of a competent man.

Dr. G. B. Longstaff, Member of the London County Council, felt some hesitation in rising in the presence of so many experts of whom he expected to seek information rather than to afford them any. It was important that architects should give information to individuals like himself as to what were really the essential points in building legislation to aim at. He would recommend them to throw aside all minor matters, but to fight for those of great importance. Thus he would like to have the general opinion of architects upon Mr. Blashill's proposal to construct the ground floor with concrete and wood, a suggestion which he thought was quite a new one. If wood was used at all it should be placed on concrete direct. The advantages were clear enough, but he wanted to know whether such a floor was practicable and durable, and whether a nuisance would not arise from the decay of the wood. It would be impossible to compel people in London to live on concrete or stone or any similar material. They should have an impervious floor, but covered with wood or other non-conducting material. The greatest difficulty was the great respect which Englishmen always showed, and rightly showed, for vested interests, but the question arose whether the consideration of these vested interests had not gone too far. The Act of Parliament of 1855 gave many powers to the governing body of London to carry out provisions in all buildings which were not erected previously, but a long time had elapsed since then. People had learnt something, and the question was whether it was not time to strike out the existing clauses exempting all houses erected prior to 1855. They should also insist upon suitable open spaces, whether the sites had been occupied previous to 1855 or not. It should not be allowable to pull down an ancient street and build a new one of the same width, or build a new house on the site of an old one covering the same or a larger area up to an indefinite height. Guides on these points would be of very great value. It was common knowledge, he supposed, that the Government had promised to bring in a Bill for the Consolidation of the Metropolitan Buildings Acts, and that a Committee of the County Council would probably be employed for many months to come in considering the details to be proposed to the Government.

Mr. Edward Bond, Chairman of the East-End Dwellings Company, said that much though the making of laws was liked, their administration was disliked by those who found themselves hampered by unpalatable restrictions. Speaking from experience of artisans' dwellings, he might say that in the model by-laws as sketched out by Mr. Blashill he found little to object to, and nearly all the regulations he had suggested were such as an honest person doing his duty might very well submit to carry out. But there was the difficulty that a great number of people who went in for building speculation did not very much care what sort of houses they put up as long as they could let them at the least possible cost. It was a matter of extreme difficulty to secure that by-laws, however excellent in themselves, should be positively enforced and carried out by those whose duty it was to see them carried out. At the present moment, however, they did not discuss the difficulties to be overcome, but what the ideas were as to framing our by-laws. There was nothing unreasonable in the suggestion implied by Mr. Pain in the opening of this discussion, but he could not agree with all he had said about houses erected previous to 1855, and some of the suggested difficulties did not exist. A large number of London houses were built before that Act was passed, at a time when regulations were not so well understood or enforced as at the present day. They would find, if they insisted upon both back and front space, even on the site of an old house, they would have to diminish the accommodation for the working classes to an appreciable extent. Many cottages were not so unhealthy which had no back yard at all, only one room opening upon a square, and they did not desire to see such cottages pulled down. If they were taken away, although people lived in them with health and comfort and satisfaction, they would be met with a serious difficulty as regards re-housing. Many would have to be deprived of the land altogether, and the municipality would have to pay handsome compensations. This would be one of the difficulties occurring in carrying out the suggestions which Dr. Longstaff threw out. He would be sorry to think, with Professor Aitchison, that only 10s. a week was earned by the average London working man. He would like to know where he had obtained that figure, seeing that from his own observation it must be very far from the exact truth. He did not think that the conclusion arrived at by Mr. Charles Booth in his book on London life was very wrong, according to which there was a large number of people earning from 15s. to 18s. a week. It was very difficult to settle the question how such people who could only afford to pay 2s. 6d. to 3s. a week for rent, rates, and taxes, could best be lodged. The Company with whom he was connected had made some attempts in that direction and had found they had rooms for people of that class which would be found to satisfy Mr. Blashill's suggested by-laws, varying from 3s. 6d. to 2s. 6d. and 2s. a week. They had been able to pay their shareholders a dividend of 4 per cent., which was now likely to reach as much as 5 per cent. They did not confine themselves to buildings of that class, but catered also for people who could afford to pay considerably higher rents. He ought to mention that most of the sites upon which their houses were built, and which had been cleared by the Metropolitan

Board of Works or the County Council under the Artisans' Dwellings Act, they had acquired at a rate very much below the strict market value. When he spoke, therefore, of having to a certain extent solved the problem, it should be taken in account that they had paid less for their land than it would have cost in the open market. Otherwise he doubted whether they would have been able to provide rooms which the people could have inhabited, and also to pay a good remuneration to those who had entrusted them with their money.

The Rev. Harry Jones said he was in favour of pulling down any bad house, whatever inconvenience it might cost to anyone. A bad man would sometimes make a bad house, but a bad house would inevitably make a bad man.

Mr. H. H. Statham said he could not agree with the conclusions of his friend, Professor Aitchison, which he thought were entirely false humanity, and illogical. If by-laws were to be relaxed because properly-built houses were beyond the means of the poorer class, in two or three generations we might reach the point where they could only afford straw huts, and the authorities would be called on to permit those in the By-laws. The enforcement of good building tended to keep up a healthful standard of life, and was a benefit to the community.

Mr. Edwin T. Hall wished to urge the necessity of excluding ground air and sewer-gas. There was a lamentable want of power to do this in the Building Acts governing the metropolis. There was no regulation whatever having for its object the exclusion of ground air as such. "Sewer-gas" was guarded against, but it must be remembered that ground air was almost as deleterious. They would remember that experiments had been made showing that air went through walls of houses at the rate of 16 cubic feet per hour, at 30 deg. difference of temperature, and at a difference of 5 deg. the rate was 17 cubic feet. When they remembered that ground air was charged with carbonic acid gas, and gases from organic matters, they would see how deadly this was to the persons inhabiting such rooms. The floor should be protected by asphalte, of which he had been an advocate for many years. There should be no space under the floor, that being a reservoir for stagnant air. They could get no syphon action to ventilate it, the ground being in most cases level on each side. In upstair rooms it was also important, though not necessary, to have a solid concrete floor. With regard to virgin soil, that seemed to him to be anything except absolute refuse. They might take the grass off a field and build on that, which would be virgin soil, whilst it should be law that the lowest room in a house should be built on an impervious material. Nor was the Act adequate in other respects. It provided for one water-closet in a house, but having put that one closet in which complied with the Act, fifty others might be put in that did not. Dr. Longstaff had referred to the necessity of having windows to more than one side of the house, and the difficulty about that had also been pointed out. He thought that for such cases dispensing power should be given to some one by the County Council. They should provide regulations for the ninety-nine cases that formed the rule, and not for the one forming the exception. The difficulty he had long felt of enforcing all penalties for breaches of by-laws should be met by placing the duty of the prosecution upon the police.

Mr. W. N. Elliott, of Plymouth, considered the erection of dwellings under sanitary conditions to be the first consideration, as all enjoyment of life depended upon it, and he thoroughly approved of the means suggested for the purpose in the paper. In Plymouth, concrete beneath the floors of houses was compulsory, except the site was on a solid rock. Sanitary inspectors had to contend with the difficulty arising from the fact that insanitary buildings were often the property of members of the local authority, and great influence was brought to bear upon the officials of the borough interfering with their exercising their duty in a conscientious manner. If these inspectors were independent men, and were paid from an independent source, the results would be more satisfactory. Then if the expense of erecting healthy dwellings for the poor was really so great that their inhabitants could not pay the rent, then he did not see why State aid should not be granted. Some of the speakers had confined their remarks to London, but in an International Congress they had to deal with all towns.

Dr. Sykes called attention to the fact that the title of the paper was the "Control of the Construction of *Buildings*," not *dwellings* only. He laid stress upon this point because he wished to mention something that bore materially on that question. Buildings were inhabited or uninhabited. Uninhabited buildings affected the health of the population only by external influences, whilst inhabited buildings affected it externally and internally. Those who were acquainted with English legislation would last year have seen an Act,—the Public Health Amendment Act,—in which there was a clause introducing a totally new feature into the building legislation. The clause was to the effect that any building that had not been erected for the purpose of a dwelling should not be used as a dwelling until permission had been obtained for its being so used by the surveyor or architect of the district. A building might be erected which was not intended to be dwelt in, and yet be used as a dwelling-house, whilst, *vice versâ*, a dwelling-house might be converted to other uses. It was through this conversion that the whole difficulty in building legislation arose, and he hoped that the County Council would adopt measures for preventing a stable-loft,—he was going to say a kennel,—being converted into a dwelling. He spoke from personal experience as a medical officer of health.

Mr. E. T. Brydges, Town Clerk of Cheltenham, wished to point out with reference to the remarks made by Dr. Sykes about the Public Health Act, that that Act was an adoptive Act which had the serious defect that one could not adopt sections of it, and for that reason local authorities had, in many cases, not been able to avail themselves of it. He agreed that by-laws should extend over all houses irrespective of date of erection, and any unhealthy house should be pulled down.

Mr. H. H. Collins desired to protest against over-legislation, especially when they saw the temper of the London County Council. He was very loth to place more power in their hands than they had. When they had shown that they knew how to wield their power he would give them more. When he heard of ideas suggested that whole streets were to be taken and to be thrown in the public way, and no compensation given to the owners, he said the less they had to do with the County Council the better. That the Building Act required some remodelling one could admit. But as it had been thirty-six years in operation without having given rise to serious complaints, notwithstanding the serious alteration of circumstances, he thought that spoke well for the Act and those who had framed it.

On Furnishing Steam from Central Districts for Heating and Power in Cities and Towns.

Mr. S. M. Burroughs read the last paper in this Section on Tuesday. It was on the subject of a public steam supply. He said:—As water, gas, and electricity have been found most convenient and economical when supplied to the general public from central sources, the idea was suggested, and has been found practicable in its working, of supplying steam from mains laid under the streets, from which it can be conveyed either for heating purposes or for power. The first practical experiment in this direction was made by Mr. Holly, of Lockport, New York, the inventor of the Holly system of large pumping engines. The system is very simple. It consists of boilers in central stations supplied with smokeless furnaces adapted to the consumption of coal-dust, which would otherwise be wasted. The steam is conducted through the streets in large mains composed of wrought-iron lap-welded pipes. Contraction and expansion are duly provided for by means of service variators, which have secured, unlockable, joints. The pipes are covered with non-conducting substances which prevent the radiation of heat. This can be secured by covering the pipes with magnesia or asbestos, covered with logs of wood with holes bored to suit. The steam can be supplied at a high pressure, say, at 80 lbs., and can then also be used for driving engines, pumping water, &c. By means of reducing valves the pressure can be reduced to 3 lbs. to the square inch, and by the use of steam meters, the quantity of steam taken by each customer can be measured. The New York Steam Company now furnish steam for 600 engines from one station. They also supply heat for the City Post-office, the Western Union Telegraph Building, and many other buildings. Their profits are rather more than 33⅓ per cent., and their customers find this method of heating more economical and desirable than any other. Heat is supplied by this system the same as water or gas; it is on tap, and can be had at any time, day or night, by simply turning a valve. While there have been killed in New York by horse-cars 64 persons in one year, by waggons 55, by gas 23, and by electric current 5, not a single case of death has occurred through the use of steam by this system. Mr. F. H. Prentiss, the Chief Engineer and General Manager, gives the following affidavit:—

"F. H. Prentiss, being duly sworn, says:—I am Chief Engineer and General Manager of the New York Steam Company, and have been in the employ of said Company and familiar with its affairs for seven years.

There has never been an explosion of a steam-pipe of this Company in the streets of New York; there has never been a paving-stone lifted, to my knowledge, except by a crow-bar, in the usual way. All talk of explosions in this connexion is supreme nonsense. The sudden generation of force necessary to produce an explosion, which can and does take place in a steam-boiler, cannot occur in the street pipes. I state, as an engineer and expert in steam matters, that such a thing is physically impossible, as there is no fire under the pipes in the streets. They are as safe and free from explosion as Croton water-pipes."

There is abundant evidence, not only in New York City but in other places where this system has been employed, to prove that it has given general satisfaction, and to indicate that there is a future of great usefulness before it. It can be utilised with great advantage by electric lighting companies, because they can employ their waste steam for the purpose. The Edison Electric Company of Kansas City paid the cost of the investment from the first year's income. The system is especially useful for college buildings, asylums, &c. The mains should be laid from 4 ft. to 6 ft. under ground. No manholes are necessary. The variators should be placed about 50 ft. or 100 ft. apart, and should be enclosed with brick. The pipes enter the buildings through a cellar or basement, and connect with radiators wherever required. The condensed steam is usually conducted into the basement, where it passes through coils exposed to a current of fresh air from the outside; this abstracts from the steam the remaining heat, and then passes upward into the rooms where required for heat and ventilation. The water is of course also pure, and can be used for general household purposes, or if not required can be passed into the sewer. If steam is required for heating water it can be easily carried into a little gravel at the bottom of a basin or tub. The steam can also be used conveniently in drying-rooms for drying clothes; it can also be used for forcing water upstairs to tanks by means of steam pressure; also for greenhouses and conservatories, and likewise for cooking. It is a great protection against fire, because if steam is turned into any room where there is a fire it speedily extinguishes it. The risk of fire is greatly reduced by the employment of such a system. The loss of heat, when the main-pipes are well covered, is considered to be not more than 5 per cent. The system has been found economical, and has been adopted in competition with good coal at 2½ dols. per ton. A few of the advantages are, briefly,—first, convenience; second, absence of fireplaces and stoves and the risks attendant upon them; third, uniformity of temperature is easily secured; fourth, absence of dust, smoke, and noxious gases which come from coal, gas, or petroleum; fifth, economy; sixth, absence of danger from explosions, economy of labour as compared with the use of separate boilers, and utility over supplying the steam for power. In 1891 the Holly system is in use in twenty-nine towns in the United States. The adoption of such a system would, I should think, be particularly desirable in London, and might be the means of abolishing the smoke nuisance. It has been found that the value of land along streets where the steam mains are laid has been considerably increased thereby. If, therefore, the supply of steam should be taken in hand by municipal authorities, a considerable amount of the cost could justly be defrayed by taxing the increased values imparted to adjacent land by the laying-down of steam mains.

Mr. R. A. Robinson said he was glad that Mr. Burroughs had brought this improvement to London. He saw no reason why the plan could not be carried out, to judge by the evidence adduced by the lecturer. He would like to know, however, how far steam could be carried. Another point was that our streets were already filled up with underground pipes, and he had

some hesitation in advocating the insertion of more pipes than were absolutely necessary. He would like, however, to see the system tried, as it would be of great importance to London.

Mr. John Atha, Leeds, pointed out that, through conducting steam in pipes underground for long distances, part of the steam would be condensed into water, and thus in a short time interfere with the proper working of the system.

Mr. Thomas Blashill said that we must know more about the scheme before forming a reliable opinion. He had no doubt that the engineers could overcome any difficulties in connexion with the matter. Perhaps people were too fond of their fire-places to take kindly to the idea, but then people were not constantly sitting round the fire, and they wanted to have all the parts of a room warm.

Mr. Burroughs, replying to various queries, said that the size of the pipes depended upon the demand. The main would have to be large, perhaps 8 in. or 9 in., but much smaller pipes would convey the steam into the houses. He had not heard of the subsidence of the soil causing any serious difficulty, but they were in the same position as with water and gas. So far the scheme had been carried out with great satisfaction in the United States, and it has also been found that it tends to an improvement in the sanitary condition of the towns. As to the collection of condensed water, there were traps provided into which such water would fall.

It being now 2 o'clock, the Chairman then declared that day's business of the section concluded.

[We will report further proceedings of this Section next week.]

SEC. VII.—ENGINEERING IN RELATION TO HYGIENE.

Presidential Address by Sir John Coode.

The following is the Presidential address with which Sir John Coode, past-President of the Institution of Civil Engineers, opened this Section on Tuesday:—

It is my first duty, and I esteem it at the same time to be my great privilege, to offer, as I now do, on behalf of the English members of the Engineering Section, a cordial welcome to those brethren of our profession who have come among us from afar in order to be present at this Seventh International Congress of Hygiene and Demography.

It has been, I can assure you, the anxious desire of the Organising Committee to provide such papers as will contribute to the advancement of the knowledge of hygiene in all its branches.

Of both the scope and the importance of the subject with which the Congress has taken upon itself to deal, there cannot surely be two opinions. Having for its principal,—or rather it may be said for its sole,—aim and object, the preservation of health (or, in other words, the *prevention* rather than the *cure* of disease), the subject of hygiene may well occupy the attention, and claim the interest, of all who desire the welfare of the human race.

As we, the British members, are well assured, it is because the object of this gathering is one which is in an especial degree calculated to benefit the community at large, that it enjoys the patronage of our honoured and beloved Sovereign Queen Victoria, and that it is supported by the Presidency of the Prince of Wales; by his presence at our opening meeting yesterday, his Royal Highness has given personal proof that he feels a genuine interest in the success of the cause which we all have at heart.

It will not, it is to be hoped, be devoid of interest if I here offer a few remarks on the progress of modern legislation in this country in respect of sanitary matters.

About the year 1838 the public mind of Great Britain became first aroused, so to speak, to the serious and growing evils arising from the absence of proper precautions for the preservation of the health of the dwellers in our large towns and cities generally, and more especially in this Metropolis in which we are now assembled.

Between 1838 and 1848, the question of Public Health in the United Kingdom was dealt with in the course of frequent debates and discussions in Parliament; it also formed the subject of inquiries by Committees and Commissions. At the end of that decade these nvestigations and discussions culminated in the establishment of an entirely new Department, which was entitled the "General Board of Health"; ten years later on that body was superseded by an Act of the Legislature, under which the important Department known as the "Local Government Board" was created.

Many names might be mentioned in connexion with the work of the two decades just adverted to, but amongst them there stands out most prominently that of one man, the late Sir Edwin Chadwick, whose untiring zeal and well-directed labours contributed more than those of any other single individual to the success of this great movement, and to the adoption of those important measures which have conduced in so great a degree to the improvement of public health in this country.

When speaking to a body of civil engineers, as I have now the honour of doing, it would be remiss to omit to mention the name of another gentleman, whom we have the privilege of including in our list of Vice-Presidents; I refer, of course, to Sir Robert Rawlinson; his eminent services, first in the organisation, and, secondly, in the direction for many years, of the Engineering Department of the Local Government Board, have deservedly received the marked approval of the Sovereign.

The importance of a correct knowledge of the laws of hygiene being granted, this importance becomes accentuated in every place where human beings are congregated together in considerable numbers, as in the case of large towns and cities, the greatest and most notable example of which is this mighty Metropolis, this "City of immensity," as it has well been called.

Is there not, therefore, a peculiar fitness in the holding of this Hygienic Congress in London, which contains the greatest congregation of human beings the world has ever seen?

Permit me to mention a fact or two which may serve to give some of those whom I now address a more exact idea of the magnitude of this London of ours.

The population of the Metropolis is, in round figures, 5,660,000. The vastness of this number will, perhaps, be somewhat better realised by my stating the fact that it is considerably greater than the numbers of the inhabitants of the cities of Paris, of Berlin, of Vienna, and of Rome all combined.

As a matter which cannot fail to be of special interest to engineers, let us turn for a moment and see what has been done in the way of works that have been executed for the special purpose of improving the health of London.

The main intercepting and principal branch sewers which have been constructed for the conveyance of the sewage of London to the two outfalls into the River Thames, at Barking and Crosnesss respectively, measure about 80 English miles, equal to 130 kilometres.

Since the year 1856, when the now extinct "Metropolitan Board of Works" was formed, there has been expended on the main drainage works alone the sum of nearly 6,000,000*l.* [120,000,000 marks or 150,000,000 francs].

As a by no means unimportant factor among the changes which, in modern times, have resulted in the better health of our capital city, a reference to the supply of water of improved quality, and in larger quantity must not be altogether omitted. Up to the end of 1890 the several companies (eight in number) had expended upon works for the supply of water to London, a sum very closely approximating to 15,000,000*l.* [300,000,000 marks or 375,000,000 francs].

The average quantity of water delivered last year to the inhabitants of London, for domestic purposes alone, was 24·75 gallons per head of population per diem, and in point of quality but little, if at all, surpassed by that supplied to any other city in Europe; this water is conveyed through pipes, the united length of which is about 4,760 miles.

The total volume of water delivered for domestic purposes only in 1890 was 64,000,000,000 gallons [290,623,000 cubic mètres]. For raising this large quantity the companies employed no less than 184 steam pumping-engines, having an aggregate of 21,659 horse-power.

As another illustration of the magnitude of London, it may be mentioned that the streets and roads within the metropolis, if placed end to end in one continuous line, would measure about 2,500 miles, equal to the distance from London to Land's End, and thence across the Atlantic Ocean to the mouth of the Gulf of St. Lawrence in Canada on the west, or, going eastward, would extend across the entire Continent of Europe, and beyond the Ural Mountains into Asia.

Whilst admitting that extensive drainage works have been executed, and that large expenditure has been incurred for improving the health of London, it cannot yet, by any means, be said that all has been done which might be done in this direction. Nor will it be possible to say as much as long as the sewage of the metropolis is allowed to flow into any part of the Thames without previous purification by the most perfect method as yet known, *i.e.*, by being filtered through land. The only alternative would seem to be the conveyance of the sewage to the seacoast beyond the mouth of the estuary of the Thames.

Nevertheless, and notwithstanding the room which exists for further improvement in the disposal of its sewage, the reduction which has been brought about in the death-rate of London in modern times is as noteworthy as it is satisfactory. A few facts will show the benefits that have accrued from the better understanding, and the more effectual application, of the laws of hygiene in our Metropolis.

In the latter half of the seventeenth century the average mortality of London is said to have been not less than 80 per 1,000; at the end of the eighteenth century it had dropped to 50 per 1,000; in the decade ending in 1850 it was 25 per 1,000; in that ending in 1870 it was 24·0 per 1,000; whilst in that ending in 1890 it had further fallen to 19·8 per 1,000.

It is gratifying to note that for the year 1889, taken *per se*, the rate was as low as 17·4 per 1,000, and there is no reason for supposing that it would not have been equally low for the year 1890, had it not been for the unfortunate epidemic which then prevailed, in consequence of which it rose in 1890 to the same proportion as that at which it stood in the early part of the last decade, viz., 20·3 per 1,000.

In the opening part of this address it was stated that it had been the anxious desire of the Organising Committee to provide on this occasion such papers as would contribute to a further knowledge of the subject of hygiene; I will now only add, in conclusion, that as far as regards our own particular section, we, speaking on behalf of the Engineering Committee, have, in this respect, endeavoured to fulfil our part, and have also made arrangements for your inspection of works of professional interest from a hygienic point of view.

We trust that the papers to be read and discussed, and the visits which have been organised, will prove to be not altogether uninstructive, and that they will result, in some degree at least, in furthering the aim and object of this International Congress, *i.e.*, the advancement and diffusion of sound and useful knowledge relating to the all-important subject of sanitary science.

Water Supply.

Mr. Alex. R. Binnie, M.Inst.C.E., Engineer-in-Chief to the London County Council, read the following paper on this subject in Section VII. on Wednesday:—

A good water supply, forming as it does the basis of all our modern sanitary science, is deserving, in a meeting such as the present, of the most careful consideration.

And in the forepart of our inquiries on the subject it cannot be denied that, however obtained and however treated from an engineering point of view, we must, in the first instance, obtain a water of good quality and unimpeachable as to purity.

At first sight this may appear almost a truism, but unfortunately we do not find it to be either universally admitted or always observed in practice.

For this we have to look to the great and almost general result of our modern modes of life and civilisation, which tends more and more to aggregate our population towards large centres of wealth and industry, and these we observe are generally situated on the banks of important rivers, or in river valleys not far distant from tributary streams.

Not only are thickly inhabited areas in themselves improper sources of water supply, but they are also directly the cause of pollution to the streams and rivers which flow through them.

Consequently, we find many of the large towns of Great Britain, which are governed by municipal corporation, such as Glasgow, Edinburgh, Lancaster, Manchester, Liverpool,

Halifax, Bradford, Leeds, Belfast, Dublin, and many others, resorting at great expense to uncultivated mountain tracts, almost uninhabited, and bringing the water from great distances so as to obtain a pure and uncontaminated supply.

When, therefore, we occasionally see large towns and cities which have not considered it necessary to take these precautions or to incur the consequent expense, but still continue to drink the water of rivers largely polluted by the more or less clarified sewage and the manure of populous areas, we are led to ask ourselves the question, whether the large expenditure of capital that has been incurred in certain cases to obtain a pure water supply has not been an entire waste of our resources.

There can be little doubt that human beings can, for a considerable time, drink with impunity water largely contaminated with the excreta, both solid and fluid, of healthy persons, and that they are able to do so with impunity and without loathing and disgust appears to be due to ignorance and apathy on the part of the water consumers, and to the power which rivers possess of apparently destroying and veiling the more gross and palpable polluting substances.

There are some persons, no doubt, who teach that running water has the power of entirely destroying sewage and other polluting matter which may pass into it; but there are few, let us hope, who would say that we can with safety drink water which has been polluted with the excreta of persons suffering from cholera, typhoid, small-pox, and similar diseases, and yet this is practically the position taken up by those who advocate unreservedly the propriety of deriving supplies of drinking-water from rivers on the banks of which, at no great distance, are situated large towns, for sooner or later we must expect epidemics to arise even under the most careful management.

Of two facts we may feel quite confident,—first, that water subject to pollution is a very potent factor in the spread of disease; and, second, that there is, perhaps, no better mode of introducing into the human system any substance which it can absorb, than by drinking it in the form of a solution.

This being the case, it almost follows as a natural consequence that the utmost care should be taken to guard our supplies of drinking-water from contamination; and yet we see persons around us who shut their eyes to observed and well-known facts, and speak of the teaching of science and the experience of the world as sentiment, and who continue to force upon a large number of their fellow-creatures supplies of water contaminated with the excreta of millions of men and animals.

That wells are frequent sources of death and disease, due to their contamination by house-drains, is too patent to require a word of remark, and yet it required the cholera outbreak of 1849, and the death of some thousands of persons, to impress the fact on the people of London. And it appears to be forgotten that to drink river-water polluted by sewage cost London in the cholera outbreaks of 1854 and 1866 the deaths of over 16,000 persons.

That people will go on for years drinking a supply contaminated by infiltration from graveyards, notwithstanding frequent warning, is proved by the outbreak of enteric fever in 1888, at Cradley, which caused sixteen deaths in 113 cases.

The case of Lausen, in Switzerland, in 1872, proves that typhoid fever can be communicated by spring water flowing miles underground from a neighbouring valley.

The cholera outbreak in Spain in 1885 showed that, generally, the disease passed down the valleys, decimating the towns which drew their water from the rivers, but passing those which were independent of the rivers, and had pure and uncontaminated supplies.

In India the author has seen a town in which cholera had become endemic, almost entirely freed from that dire disease simply by giving up the water supply derived from a populated drainage area and resorting to a purer and uncontaminated source.

And the outbreak of last year of enteric fever in the districts of Stockton and Middlesbrough and Darlington, which derive their water supply from the River Tees, proves that the germs of that disease are not destroyed by filtration in their passage for over thirteen miles down that river from Barnard Castle.

All these are cases in which chemical science is of little assistance, as it is powerless to detect the germs of disease; it can tell us of the presence of organic matter, but without a careful inquiry into the previous life history of the water it cannot pronounce that under all circumstances it is a safe and pure drinking-water.

Nor from the experience of Valencia in 1885, and of Stockton and Middlesbrough, can we place much dependence in sand filtration as an effectual preventive of disease; sand filtration may arrest the living germs, but it is unable, apparently, to stop the passage of the minute spores from which they spring.

The precipitation and clarification of sewage effluent, by chemical agency, also can hardly be relied upon, as it merely abstracts about one-fifth of the more solid impurity, leaving four-fifths of the dissolved organic matter to flow off into the river.

What, then, are we to expect from the continuance of supplies to large cities from sources so polluted but that such cities may go on for years, perhaps boasting of the chemical purity of their water and their low death-rate—forgetting that the constitutions of their water-consumers are being gradually prepared, by continually drinking small quantities of diluted sewage, to receive the germs of some violent epidemic which sooner or later will visit the sources of supply, and then will follow such an outbreak of death and disease as will cause consternation throughout the land?

[We will report further proceedings of this Section next week.]

THE REGISTRATION OF PLUMBERS.

On Tuesday afternoon, after the various sections of the Congress of Hygiene and Demography had risen for the day, a special meeting was held in the theatre of the University of London, Burlington-gardens, to discuss the subject of "The Education and Registration of Plumbers in Relation to Public Health." The efforts of the Plumbers' Company in developing a scheme have been steadily pursued for some time, and have been, as our readers are well aware, very encouraging.

Sir Douglas Galton presided, and among those who supported him was the Master of the Plumbers' Company (Mr. W. H. Bishop), the Lord Provost of Edinburgh, Sir Philip Magnus, Mr. E. Hart, Mr. John Smeaton, Mr. W. R. E. Coles (the Clerk to the Plumbers' Company), and others. The attendance was a large one, and among those present were representatives from the following towns in England and Wales:—Birmingham, Bradford, Brighton, Bristol, Cardiff, Hull, Leeds, Leicester, Lincoln, Liverpool, Manchester, Newcastle, Nottingham, Plymouth, Sheffield, Southampton, Swansea. Scotland: — Aberdeen, Dumfries, Dundee, Edinburgh, Glasgow, Inverness. Ireland:—Belfast, Cork, and Dublin.

Sir Douglas Galton, in opening the proceedings, said he had hoped that the duty of presiding at that meeting would have fallen into more able hands than his, for it was thought that Mr. Ritchie (the President of the Local Government Board) would have presided, but he unfortunately had to leave town before the meeting. Then, in the next place, it was thought that they would have had the assistance of Lord Basing, a former chief at the Local Government Board, but he had been compelled somewhat unexpectedly to leave London. So the duty of presiding had fallen upon him. He did not know that there was any portion of the great Congress which was being held in that building which was of higher importance than the subject for the discussion of which the meeting had been convened. They were doubtless aware that the health of communities depended in a great measure upon the efficient carrying out of details of plumbing, and the Plumbers' Company had been most anxious during the last few years to improve the education of workmen engaged in this important branch of work. He could assure the Plumbers' Company he had always felt the warmest sympathy with their efforts, and he could bear witness to the work done by the Master and Wardens of the Company, and also that accomplished by their able and efficient clerk (Mr. Coles), and he might add that their efforts had produced the most valuable results.

The Master of the Plumbers' Company (Mr. W. H. Bishop) then read a short report he had prepared on the subject, in which he referred to the efforts made by the Company to extend among workmen a technical knowledge of the art of plumbing by the registration of qualified men. It was now about seven years since this work had been begun, and at the present time there were 950 persons engaged in the chief towns of the United Kingdom and Ireland in assisting to carry out the objects of the movement. The movement had, however, now reached a position when it was felt that it was necessary to give some legislative encouragement to it, and the Court of the Plumbers' Company had drawn up a draft Bill which they considered should be presented to Parliament during the next session, for the purpose of carrying out the proper education and registration of plumbers in the United Kingdom.

The Right Hon. J. Boyd, Lord Provost of Edinburgh, then moved the following resolution:—

"That this special meeting of the International Congress of Hygiene, assembled to consider the necessity for securing the greater sanitary efficiency of the plumbers' work and drainage of dwelling-houses and other buildings, desires to record its opinion that an organised and efficient system of registration of qualified plumbers is essential to the protection and preservation of the health of the community, and that such a system having been established in the chief cities and towns of Great Britain and Ireland by the protection of the Worshipful Company of Plumbers, London, and the plumbers and sanitary authorities of those places, the time has now arrived when application should be made to Parliament for powers enabling a council of competent jurisdiction and authority to take measures for systematically promoting technical education among plumbers in all parts of the United Kingdom, and regulating the practice of those plumbers who are enrolled as registered plumbers."

His Lordship said it was generally admitted that there was a great need for dealing with such an important subject as the registration and education of plumbers in a manner which had not been before attempted. In seeking to bring this about, the Plumbers' Company had done an immense amount of good, and had given the public the benefit of their experience. At the present day, plumbers' work had become most complicated in its details, and where it was not done properly the public undoubtedly suffered. If this danger could be avoided the householder would feel that a great responsibility had been lifted from him, and it was the aim of those interested in the subject to put the work into the hands of duly qualified and registered workmen. There were associations in which plumbers were registered, and much good had probably been done; but it was quite clear that there must be different standards of excellence, and in different parts of the country the standard would vary. It was therefore rightly thought that it would be the best thing to bring it together under one central organisation, which should have the control of the whole. Such a movement as this was well fitted to inform the public mind in regard to such important matters of health, and in carrying out the project to the end, the plumbers of the United Kingdom and Ireland would be expected to attain the highest standard of excellence.

Mr. Bailie Crawford (Chairman of the Health Committee of the Corporation of Glasgow), in seconding the resolution, remarked that in Scotland the title of the subject was really understood to be plumbing reform. His connexion with the movement was as the Chairman of the Health Committee of the Corporation of Glasgow, and he had some short time ago attended a conference composed of practical men in the trade, and bearing in mind the fact that Scotchmen were held to be a hard-headed race, who were not given to imaginary views, he considered that the unanimous approval of the movement which was given at that conference was a compliment to the Plumbers' Company, and proof of the practical character of the scheme. He hoped he would not be accused of hurting the feelings of the plumbers present when he said that they had not travelled with the times. But he thought the plumbers and the public generally had at last begun to realise that something would have to be done to bring the craft up to the standard of modern means and requirements. He was glad to know that this movement was no way associated with any idea of increasing the profits of the masters, but simply and solely for the public good. The basis of such a movement was education, and in his own mind that was really the key of the whole thing. Then they wanted to regulate the powers of education, and in seeking to properly develope the scheme the Plumbers' Company thought that Parliament should be asked to give its aid. He thought it said much for the interest the Scotch people took in the subject, when he reminded those present that the first prize of the City and Guilds of London Institute was carried off by one of his countrymen.

Sir Charles Cameron (Medical Officer of Health for Dublin), in supporting the resolution, said that the movement had been unanimously adopted in Dublin, thanks to the exertions of Mr. Coles, who came over and quickly succeeded in establishing a branch organisation in connexion with the Plumbers' Company and he could bear testimony also to the way in which Mr. Coles worked there. Referring to some sanitary work which had been carried out in Dublin, Sir Charles said when plumbers were wanted, the ironmongers came boldly forward, then the glaziers, and finally the "handy" man, which showed what a great need there was for duly qualified plumbers.

Mr. David Laing, who announced himself as a registered plumber, said he inferred from the resolution moved by the Lord Provost, and the remarks made by Mr. Crawford, that there was a wide difference between the views expressed as to compulsory registration.

Mr. Coles having read the resolution to the meeting,

Mr. Laing said while giving all honour and credit to the Plumbers' Company for the part they had taken in the movement, he could not think that Parliament should be asked to pass such a Bill as had been proposed, because if, as had been suggested, a plumber should be made as qualified in his own way as a doctor or a druggist, it would be raising the trade to the position of a profession. Now, he did not think the British workman was prepared for that, and he pointed out that doctors and druggists were entitled to employ men who were not qualified. He considered that the best course to pursue was the giving of certificates for the quality of the work done, leaving it to the Plumbers' Company and other bodies to afford technical education.

Mr. W. N. Elliott (Plymouth) said he heartily supported the resolution, and thought the scheme could be very well worked out from both points. He was sure the Plumbers' Company would act wisely in taking not only the journeymen plumbers in hand, but the apprentices also, and as to any possible objection there might be on the part of the boys, the masters could decline to take apprentices whose parents objected to their learning the technical work of the trade.

The Mayor of Manchester said he would like to take this opportunity of expressing his acknowledgments and those of the people of Manchester to the Plumbers' Company for what they had done. He considered it of the highest importance that the scientific part of the plumbers' trade should be properly understood by workmen, and, further, that all taps and water-pipes in new houses should be thoroughly inspected, and that by-laws should be enforced as to the registration of inspectors.

The Chairman pointed out that it was not the Plumbers' Company who were suggesting the proposed Bill simply as their own idea; on the contrary, they had been called upon by various boroughs in the United Kingdom to bring forward a Bill with the objects of which the heads of corporations deeply sympathised.

The resolution was then adopted, Mr. Laing being the only dissentient.

On the motion of Dr. Corbett, seconded by Sir Henry Acland, a hearty vote of thanks was accorded the Chairman for his presence in the chair and the interest he took in the movement.

The Chairman, in replying to this vote, congratulated Mr. Coles upon the value of the work he had carried through on behalf of the Plumbers' Company, and added that the gentlemen who were also to be thanked for bringing about the movement were the Master and Wardens of the Plumbers' Company.

The proceedings then terminated.

JESSE HAWORTH MEMORIAL CHURCH.

On Saturday, the 8th inst., about forty members and friends of the Manchester Architectural Association visited the Jesse Haworth Memorial Church, recently built and endowed at Walshaw, near Bury, in Lancashire, by the sister and nephew of the deceased gentleman whose name it bears, who, during a long life, was the centre of a homely and successful industrial community.

A more detailed description of the edifice is reserved until nearer the date of consecration.

Its exceptional features are the thoroughness with which every part of the structure has been carried out in the most durable materials; and the large amount of memorial glass of excellent quality by which the interior is adorned.

Mr. Arthur J. Dix, of London, is responsible for the east window of the chancel; and Messrs. Cakebread, Robey, & Co., of London, for the two side windows of the chancel.

Mr. William Pape, of Leeds, has executed the large west window of seven lights, the north transept window of four lights, and three nave windows of three lights; and is engaged on two others for the main porch. The windows have been erected by members of the Haworth family and others; and were greatly admired by the members of the Association.

They are part of a complete scheme laid down by the architects, for the illustration of the birth, life, death, resurrection, and ascension of our Lord, to whom the church is dedicated, and of His works and parables. The church was designed by Mr. L. Booth, F.R.I.B.A., and has been carried into execution under the supervision of Messrs. Booth & Chadwick, of Manchester.

Books.

Königliche Museen zu Berlin. Verzeichniss der vorderasiatischen Altertümer und Gypsabgüsse, Herausgegeben von der General-Verwaltung. Berlin. 1889. W. Spemann. Mit einer Karte und einer Schrifttafel.

THE publication of this volume of the series of popular guides to the Berlin Museum is specially timely. The issue has been long looked for, and no doubt necessarily delayed by the recent rapid accumulation of material in the Museum. Just now, *apropos* of the discoveries at Sendschirli (which we notice elsewhere), public attention is much drawn to monuments of Asia Minor. The little book before us will help many people, besides the actual visitors to the Museum, out of a difficulty. Curiosity about Asia Minor antiquities is more easily aroused than—in any legitimate fashion—satisfied. Here we have in succinct form (only 132 pages), and for the price of 5d., just the needful facts. A brief account of the ancient history of Asia Minor, including the Hittites, opens the volume. Next comes an excellent map, in which it is possible to find the lie of modern sites of excavation, *e.g.*, Sendschirli and Boghaskoï. An introduction to local epigraphy, with a tabular view of the form of letters in use, will be welcome even to the professed archæologist. All this is preliminary to the actual catalogue of the antiquities and to the casts, which, after the excellent custom of the Berlin Museum, supplement the originals. Of the catalogue itself it is not necessary to speak. The Berlin smaller catalogues have long been models of what can be done to popularise science without degrading it.

Petits Edifices Historiques; recueillis par A. Raguenet, Architecte; avec Notices descriptives facilitant l'Etude des Styles. Paris: Libraires - Imprimeries Réunies (Ancienne Maison Morel). 1891. Livraison 1 et 2.

This, which is a monthly publication just commenced, appears likely, if carried on as begun, to be a publication of some interest and value. The intention appears to be to devote each number to the illustration and brief description of a small building of historic and architectural interest. The first number illustrates the curious little church of Tracy-le-Val, near Compiègne, Romanesque or what we should call Norman in general style, though some Flamboyant windows have been inserted. The second part deals with the far better known monument called the house of Agnes Sorel. The illustrations of this are very full, including a great deal of the interesting decorative detail, and are very carefully and beautifully drawn. We hope the work will be continued in the same style. It deserves success, and ought to be of interest in this country as well as in France.

Rockingham Castle and the Watsons. By C. Wise. London; Elliot Stock: Kettering; W. E. & J. Goss. 1891.

This is rather a book of political and social history than of architecture. The plan of Rockingham Castle is reproduced by permission from Clark's book, but some sketches of various parts of the house are added, and reproductions of some family portraits. A curious diagram is published of the fortification of the circular keep by the Parliamentary garrison in 1644, "The plott of the mound part of the Castle of Rockingham," preserved among the Rockingham papers.

The idea of a history of the place occurred to the author when called on to look over and index the collection of manuscripts at Rockingham Castle. He has made use of his materials to compile a very interesting and agreeably-written history of the successive owners of the castle, with the publication of a good many letters scattered up and down the pages, which let in a little realistic light from time to time on the narrative. It is rather a book for a drawing-room table than for an archæologist's library; but many people will not like it the less for that.

County Councils and Technical Education. By J. C. Buckmaster. London: Blackie & Son.

This is a pamphlet containing a good deal of sensible practical suggestion in regard to the direction and application of technical education, especially in rural districts. The writer points out truly that lecturing in the ordinary acceptation of the word is of little value for teaching. "A lecturer on science who is clever in his experiments and illustrations may awaken some interest in his subject, and pass away a pleasant evening, but what has he taught?" Lecturing may awaken interest in a subject, but it is not teaching. What is wanted may be defined rather as demonstration than as teaching. The author suggests the closer and more practical application of geometrical problems, for example, to every-day work. "A boy gabbles over at school 'on the same base, and on the same side of it, there cannot be two triangles,' &c. To the beginner this seems only a jargon of words. It is never referred to as a proposition upon which the tracing of rectangular framework depends, and one of extensive application in carpenter's work." The pamphlet is worth the attention of those interested in the subject of technical teaching.

Memorials of Edinburgh in the Olden Time. By Sir Samuel Wilson, LL.D., F.R.S.E. Part IX. London: Adam & Charles Black. 1891.

The ninth issued part of this work deals with the history of the Canongate and Abbey Sanctuary, St. Leonard's, St. Mary's Wynd, and the Cowgate. It contains some interesting and well-executed views of various old corners of Edinburgh, some of them still existing some now disappeared. Some of these, such as "Sympson the printer's house in the Cowgate," serve to confirm the truth and realism of some of Scott's descriptions of old Edinburgh, one of the most picturesque and unsavoury of cities.

Bits of Canterbury Cathedral; drawn by Walter Tallant Owen. Constock & Co. New York; Sampson Low & Co. London.

This is a pretty little octavo volume of pen-and-ink sketches, slight but executed in an artistic style. There is nothing in it of special value to architectural students, but it forms a pleasing artistic memento of the cathedral and some of its details.

Correspondence.

To the Editor of The Builder.

Re CARPENTERS AND JOINERS.

Sir,—I am instructed by the Committee of this Association to inform you that the report, circulated in some of the daily papers, that the masters in South London had opened their shops, is absolutely without foundation. So far from such being the case, the masters in these districts held a largely-attended meeting, at which a resolution to the following effect was unanimously passed, viz.:—

"That this meeting of local builders desires to express its entire confidence in the Committee of the Central Association of Master Builders, and assures them of their support in resisting the unreasonable demands made by the workmen."—I am, Sir, yours truly,

E. S. Henshaw, Secretary.

The Central Association of Master Builders of London,
31 & 32, *Bedford-street, Strand, W.C.*,
London, August 12, 1891.

SAFETY OF SCAFFOLDS.

SIR,—I have taken the *Builder* in now for many years, and in your last issue I notice the case of Smith *v.* Greenwood, in which the plaintiff is non-suited and the foreman appears to be exonerated from all blame.

I have been a contractor's-foreman now for twenty years, and after giving instructions for the erection of a scaffold I consider it my duty to inspect that scaffold before material or workmen ever go thereon.

All ropes having been used before should be tested by means of a lever, bad ones will break and good ones be improved by stretching; old poles should be thoroughly overhauled, as they are often defective when the external appearance is good.

I have some very heavy girders to hoist, and I have some good scaffolders, but it is a foreman's duty to inspect as well as instruct, as he can often see the necessity of an additional rope or brace which has been overlooked by his men.

A GENERAL FOREMAN.

*** We entirely concur in the conscientious view which our correspondent takes of the duty and responsibility of a foreman in such cases.

BRASS.

SIR,—I lately paid a visit to Braughing Church, in Hertfordshire. It has been restored within the last three years, and in the main discreetly; but, on looking round, I was sorry to miss some brasses which, to the best of my recollection, used to lie on the floor of the nave, near the chancel-arch. On enquiry I was told that they had "disappeared" during the restoration. As this was of so recent a date, I should think it would be possible to recover them and replace them in the church. Another thing I was sorry to see, viz., that the old font, with its Jacobean cover, has had to make way for a new one, and was standing outside, against the tower. I hope those concerned, when their attention is drawn to this, may feel with me that it would be far more consonant with our present ideas that this should be replaced rather than banished to make way for a new one, however excellent in design.

ANTIQUARY.

BUILDING STRATEGY.

SIR,—Permit me through your columns to caution builders, when taking contracts for building houses on new estates, against being led into assuming upon *primâ-facie* evidence that they are dealing with the freeholders of the land upon which the buildings are to be erected, as I happen to be aware that a considerable business is being done in a manner probably not legally fraudulent, but still very embarrassing to men of small capital.

The *modus operandi* is as follows:—"A" takes a number of plots of land of "B," under agreement to build certain houses at a certain minimum cost, stipulating for from 65 per cent. to 75 per cent. advances on certain stages as the works proceed; and also making it a *sine quâ non* that "B" gives him the option to purchase the freehold at so many years' calculation of the ground-rent.

"A" then represents to "C," the builder, that he ("A") is the freeholder, and upon that faith "C" contracts to build, a small banking balance (of, say, 50*l.*) being constantly kept at a second-rate bank helping the question of reference.

The agreed payments of instalments as between "A" and "B" and "A" and "C" are, of course, judiciously prepared by "A's" architect, so that at a given point "A" shall have drawn from "B" all he is entitled to on the job, and at the same time "C" shall be wanting a very large proportionate draw from "A."

Then "A" slips out of the business, leaving "B," the actual freeholder, to settle with "C," the actual builder. Of course, I need scarcely add that "A" does not run away, but coolly sits down and laughs at both of them.

EDWIN HULL.

THE ENGLISH IRON TRADE.—The English iron market shows few special features this week, the outlook continuing very gloomy. The Glasgow warrant market remains inanimate, and Scotch makers' iron is still slow of sale. The Middlesbrough iron market is in an unsettled condition, owing to rumours of a strike amongst the blast-furnace engine and crane men in several important works in the Cleveland district. Hematite iron in the North-west is very quiet, and mixed numbers of Bessemer pig have experienced a fall of 1s. 6s. per ton. The improved tendency in manufactured iron is maintained generally; but North of England works suffer from a dearth of orders. Tin-plates remain quiet. Steel is in very slack demand, and in the North-west quotations have been reduced from 2s. 6d. to 5s. per ton on several descriptions. Old materials continue in moderate inquiry. Shipbuilding shows a slight improvement, but the Scotch strike is still in progress. Engineers remain in fair employment, but there is somewhat of a tendency to quieten down. The coal trade is fairly active.—*Iron.*

The Student's Column.

MARBLES.—VII.

FOLLOWING the classification of the aqueous rocks, as laid down in our last article, we have now to briefly describe the origin of that class in which the material forming the deposit has been derived from chemical precipitation in water; and it will be convenient under this heading to allude also to chemically-formed rocks in general, with especial reference to those which are now used for decorative purposes.

By far the most abundant mineral deposited chemically in water is carbonate of lime. Oolite is one of the most familiar examples of this class. On former occasions we have described at some length the origin of this important building stone, and it is unnecessary, therefore, at the present time to do more than to remind the student that oolite is mainly formed of small shot-like grains, each grain having a concentric structure (resembling the successive coats of an onion) with a fragment of some kind in the centre; and that the cementing together of these grains makes the compact rock. The oolitic granules are believed to have been formed in water supersaturated with carbonate of lime which was precipitated around each of the minute fragments alluded to, at the same time that these latter were gently rolled about by the action of the water. All oolite and pisolite spherules were not formed in this way, however, for recent research has established the fact that some were formed organically. The crystalline oolite near Weldon, Ancaster, and in other parts of Northamptonshire and Lincolnshire, was occasionally employed in the Middle Ages in the manufacture of marble chimney-pieces and the like; but, except from the historic interest attaching to it, the rock is not of importance as a marble.

Travertine is a stone which owes its origin to the precipitation of calcareous matter, both direct and through the agency of minute algæ; whilst siliceous sinter is formed in somewhat the same way, only that the precipitate is silica, and not lime.

Stalagmites and stalactites are formed principally in limestone caves. Water in passing through limestones derives a considerable proportion of lime from them. On arriving at caverns in the rock the water is frequently made to part with this carbonate of lime; as each drop gathers on the roof of the cavern and begins to evaporate and lose carbonic acid, the excess of carbonate which it can no longer retain is deposited round its edges as a ring. Drop succeeding drop lengthens the original ring with a long pendant tube which by subsequent deposit inside becomes a solid stalk, and on reaching the floor may thicken into a massive pillar. At first the calcareous substance is soft, and when dry, pulverulent; but by degrees it becomes crystalline. Each stalactite is found to possess an internal radiating fibrous structure, the fibres passing across the concentric zones of growth. The stalactite remains saturated with calcareous water, and the divergent prisms are developed and continued as radii from the centre of the stalk. From this, the student will perceive the cause of the concentric structure exhibited in cross sections of the material, when polished for decorative purposes.

Alabaster is, perhaps, the most important chemically-formed aqueous rock from the architect's or sculptor's point of view. Geologically it is a species of gypsum, which is a hydrous sulphate of lime consisting normally of lime 32·56, sulphuric acid, 46·51, and water, 20·93. We should require a much larger space than is now at our disposal to give an adequate idea of the origin of this material. Possibly no rock has been formed by such widely different methods.* It may be produced, 1st, in the sense in which we are now alluding to it, viz, as a chemical precipitate from solution in water, as when sea-water is evaporated; 2nd, through the decomposition of sulphides, and the action of the resultant sulphuric acid upon limestone; 3rd, through the mutual decomposition of carbonate of lime and sulphates of iron, copper, magnesia, &c.; 4th, through the hydration of anhydrite; and 5th, through the action of the sulphurous vapours and solutions of volcanic orifices upon limestone and calcareous rocks. But it is by the first of these methods that the thick beds of gypsum have mainly been formed. The first mineral to appear in the evaporation of sea water being gypsum, it has been precipitated on the floors of inland seas and saline lakes before the more soluble salts. On the other hand, beds of ordinary limestone may have been converted into gypsum by the percolation through the strata of water charged with sulphuric acid.

Gypsum is called alabaster when it occurs in its massive form.

The third division of aqueous rocks, which comprises those formed by the successive accumulation under water of organic remains, is by far the most considerable section of the whole group; from this we obtain many kinds of stone used in decoration. It includes the "shell marbles," "ammonite marbles," "encrinite or crinoidal marbles," and "madrepore marbles," all of which, it may be premised, are limestones of one kind or another. A typical rock of this class is almost entirely composed of the remains of hard parts of various organisms which once lived in water,—either in the sea, rivers, or lakes. Thus, we find that many Devonshire marbles are largely made up of the altered skeletons of corals, of species long since extinct; the pattern of ordinary Derbyshire marble, if looked carefully into, will be seen to contain the stems and cups of crinoids, a group of organisms allied to the sea-urchin; a marble from Somersetshire, and several from the Continent are full of *Ammonites*, a group of cephalopods which disappeared long ago from the face of the earth, and which had certain affinities with the modern *Nautilus;* the Purbeck and Petworth marbles are largely composed of a genus of marsh-loving and fresh-water snail, known as *Paludina*, and so on.

The student, when reflecting on these facts for the first time, will, probably, find some difficulty in perceiving how the accumulations of these organic remains became compacted into a solid rock. At the outset this, no doubt, seems a difficult problem; but when we examine the rocks themselves a solution soon presents itself. We see at once that a considerable proportion of finer matter usually exists interspersed amongst the more conspicuous shells and other remains. The fine material may be composed of minute fragments of the organisms near which they are found, of smaller genera which lived in the water contemporaneously with them, of chemically precipitated matter, or in some instances of calcareous mud, and we learn that the whole is bound together by a glassy material. It is the last-mentioned substance which really renders the rock capable of taking a polish. Without it the stone would either be full of small cavities, or a loosely-constructed mass, of little commercial value save in some instances as a freestone, or in the manufacture of lime. The glassy or crystalline material evidently, then, plays a most important *rôle* in the constitution of marbles of this class. Let us examine it further. Drop a little weak hydrochloric acid on it, and strong effervescence results; press the point of a pen-knife on the stone and the latter is scratched with facility; place a transparent section of it under the microscope and a number of parallel lines and other things of a similar nature will frequently be witnessed. These simple tests afford a clue to the nature of the crystalline material, and we find that in the majority of instances it is the mineral calcite,—a crystalline form of carbonate of lime. We will now endeavour to give some idea of the manner in which calcite forms in such rocks as those now under discussion.

We have said, with reference to the formation of stalagmite, that water in passing through limestones obtains a certain amount of lime from them,—how, is beside our present point. Water parts with this lime under certain conditions; in fact, it is practically crystallised out of the water by an ordinary process of crystallisation. This being so, we may easily conceive that the time will come when, under favourable conditions, almost all the available interstices are filled up by calcite. If this were all that took place on the conversion of a loose deposit of organic remains into marble, the geologist's task of working out the method of formation of the stone would soon be ended. We should be presented with the skeletons and other remains of certain organisms, the spaces and interiors of which would be occupied by crystalline calcite, and the whole bound together by the same mineral. But if we regard the rock attentively, we shall find that another important change has taken place. Supposing the

* On this subject consult Roth, "Chemical Geology," i., p. 553; also Geikie, "Text Book of Geology," 1882, p. 115.

student is examining a shell marble, let him compare the composition and structure of the shell of a *Cardium* (cockle), or other similar mollusc living in the sea at the present day, with the composition and structure of analogous genera of shells in the marble. In the vast majority of instances he will then perceive that the original nature of the fossil shells (in the marble) has completely altered,—they have retained their original form, but their whole substance has undergone a substantial modification. This does not surprise the geologist, who is accustomed to the phenomenon. He can indicate the manner in which the trunks of trees have been altered into a species of flint (chert), which, in certain parts of the world (Antigua, for example), is abundant enough to be polished on a small scale as a local marble. Silicified wood in which the cellular structure and stages of growth is almost, if not quite, as clearly defined as in the trunks and branches of trees of modern growth, is common enough in several geological formations in our own islands; and yet this fossil wood contains no carbon, and its delicate tissues have been transformed into imperishable stone. The process by which this was effected is known as "petrifaction," and this term should be distinctly reserved for those cases only in which the original substance of the petrifaction,—whether it was wood, shell, coral, bones, or other organic remains,—was molecularly replaced by mineral matter, with partial or entire preservation of its internal structure. In other words, as rapidly as the original substance decayed, or was dissolved particle by particle, it was replaced there and then by mineral matter—calcite, silica, or what not—which was in solution, and was waiting to do the work; a facsimile, as near as may be, of the original was thus produced. In other instances the organism decayed and left a cavity in the stone, which, on being subsequently filled up, presents us with a cast only of the original.

Returning now to the shell marble, we notice that the shells therein have been altered by either of the processes indicated, and have become calcite, similar to other parts of the stone,—in fact, nearly the whole of the rock is turned into crystalline calcite. But it frequently happens that the calcite forming the fossils is of a more durable description than that by which they are enveloped, and these shells, on weathering, will stand out in relief on the surface. Or the shells may be of a different mineral from the surrounding matter, leading to inequalities in the stone. This is an important phase of our subject which will be duly discussed.

In those marbles where the organic remains were buried in a kind of mud, or other similar impure matter, the stone is correspondingly affected, and is difficult to polish.

Still further modifications have been induced in certain marbles of the class now treated of. In addition to having been subjected to enormous pressure, the whole formation as described, has frequently been more or less crushed, or broken up, and a number of cracks produced, which were subsequently filled up by calcite or other minerals, and this has been repeated many times. The student will now understand how veins in marble sometimes originated. But we must reserve further remarks on this subject for a future occasion.

GENERAL BUILDING NEWS.

New Municipal Buildings for Bath.—The Corporation of Bath have just received a report from Mr. William Young, F.R.I.B.A., of London, as to the best mode for securing additional accommodation for municipal purposes. He suggested two alternative schemes. Under No. 1 he would place the whole of the building required for increased municipal accommodation, and the new police-court and rooms in connexion therewith, on the south side of the Guildhall. This would take a portion of the market and the whole of the houses in Orange-grove up to the police-station. By this plan the new court and the present one, with all the rooms, would be in immediate connexion with the present court, and the council-chamber and municipal offices would also be in immediate connexion with the present council-chamber and staircase. On the north side of the Guildhall the art galleries and science and art schools would be placed. This site would take the ground occupied by the "White Lion" Hotel and the municipal offices adjoining. The façade of the art gallery, &c., should be so designed as to form one important pile of building, extending from Bridge-street to Orange-grove, with the Guildhall as a centre. Under scheme No. 2 the market and other property on the south side of the Guildhall is not interfered with. The new court and municipal accommodation is placed on the site of the "White Lion" Hotel. By this plan it will not be possible to get communication between the new court and the present one on the ground-floor, although on the first floor communication can be got between the new council-chamber and other apartments on the first floor and the present chamber. He would put the art gallery and science and art schools at the corner of Bridge-street and Newmarket-row, and, to make the scheme complete, would get a frontage to Bridge-street extending from High-street to Newmarket-row. The centre portion of the building could be used to form a grand arcade-entrance leading to the centre of the market, with, perhaps, shops on each side of the arcade. In both schemes Mr. Young suggests removing the inner row of piers surrounding the octagonal centre of the market, putting a new domed iron roof extending to the outer wall of the octagonal centre. Under scheme No. 1, the cost of a building two storeys high—*i.e.*, ground and first floors, including a basement under the whole building, the floors to range with present building, would be about 19,000*l.* If with another floor added—*i.e.*, basement, ground, first and second floors, the cost would be 23,000*l.* The cost of a building under scheme No. 2, including basement, ground, and first floors, would be 17,000*l.* If with basement, ground, first and second floors, 24,000*l.* The City Corporation, on the recommendation of the Joint Committee, decided to adopt scheme No. 1, and to institute an open competition for designs, with Mr. Young as assessor. The question of the premiums to be offered was left to the Committee to arrange.

Bank Premises, Budleigh Salterton.—The new premises of the Wilts and Dorset Bank at Budleigh Salterton, Devon, were opened on the 7th inst. The building is situated in Fore-street, and the style of architecture is modern. The frontage is 44 ft., and the interior comprises a banking-room, 22 ft. square, with manager's and strong-room, &c. The residential part of the building consists of dining and drawing-rooms, entrance-hall, six bedrooms, with balcony, kitchen, and usual offices. Mr. J. C. Palmer, of East Budleigh, was the contractor, the architect being Mr. G. W. Silley, of London.

Public Baths, Broughton.—The new baths erected on a plot of land bounded by Great Clowes-street, Mauriel-street, and Lucy-street, Broughton, Lancashire, were formally opened on the 5th inst. by the Mayor of Salford (Alderman B. Robinson). The baths are from a design by Messrs. Magnall & Littlewood, of Manchester. Messrs. R. Neill & Sons had the general contract for the erection of the baths, the plumbing has been done by Messrs. W. Harrison & Son, and the boilers, steam service, and fittings have been furnished by Messrs. T. Bradford & Co.

New Mariners' Church for St. Ives (Cornwall).—The picturesque town of St. Ives, Cornwall, is to have a new mariners' church, and Mr. Edmund Sedding, of Plymouth, has been appointed architect. The site is a particularly good one, standing on the elevated ground behind the quay.

Free Public Library, Peterhead.—At Peterhead, on the 8th inst., the foundation-stone of the Free Library, to the building of which Mr. Andrew Carnegie has contributed the sum of 1,000*l.*, was laid by Mrs. Carnegie. The site of the new building is between Queen-street and St. Peter-street, in a line with the Sheriff Court Buildings. The architectural design of the building is adapted from the English Renaissance, and is selected from a competitive plan sent in by Mr. Duncan M'Millan, architect, Aberdeen. On the ground-floor there will be the lending library, the reference library, the reading-room, and the conversation-room, while on the first floor, access to which will be reached by a staircase leading on to a landing, there will be situated the museum, art gallery, recreation-room, and committee-room. A tower rising to a height of 73 ft. and finished with a dome of octagonal shape, will occupy the corner of Queen-street and St. Peter-street. The building, which is two stories high, will be 97 ft. in length. The stone used in the construction of the building will be granite taken from the quarries in the district, and the material internally will be varnished pitch-pine. The cost of the erection will be 3,056*l.*, and a site has been purchased at a sum of 1,000*l.*

Bank Premises, Bath.—New premises for the Bath branch of the Bristol and West of England Bank were recently opened in Milsom-street. The Classic elevation of the previously-existing buildings has been restored, the shop-front ground-floor taken away, and the rusticated stylobate that had been removed rebuilt, somewhat modified in treatment. It is carried out in Shap granite. The three arches and the cornice with balcony projections corbelled out on the keystones are in Corsehill red sandstone. The spandrel panels have carvings of the arms of Bristol and Bath, and two symbolic subjects with full-length figures of Commerce and Agriculture. The balconies, with balusters, are of red Mansfield stone. A small vestibule laid with mosaic leads into the bank. The bank proper is a long apartment, with panelled ceiling, which, as well as the walls, is decorated with soft, neutral tints and varied ornamental treating, the plastering being executed in Carlisle cement. The flooring of the public portion of the bank is laid with mosaic, the floor elsewhere being of oak. A chimney-piece of yellow Mansfield stone, with carving, is fixed in a corner of the bank. A flight of stairs at the rear of the counter leads to the basement-floor, where is situated the strong-room, constructed with steel lining, and faced with glazed fireproof bricks. This floor also provides book and store rooms, and lavatory and other conveniences, these being also faced with glazed bricks. The architect for the work was Mr. Alfred S. Goodridge, of Bath. The contractors were Messrs. Hayward & Wooster, who carried out the whole of the work with the exception of the carving, which was executed by Mr. Sheppard, of Bournemouth. The bronzes, wrought-iron work, gasfittings, &c., are by Messrs. Singer & Sons, of Frome, the decorations by Mr. Beaven, jun., Bradford-on-Avon, and the mosaic by Messrs. Craven, Dunnill, & Co., of Jackfield.

The Grand Hotel, Cromer.—On the 15th ult. the Grand Hotel, Cromer, was opened. The building, which is of red brick with stone dressings, has a frontage of 180 ft., and stands upon the West-cliff. The roof is covered with green slates, and is surmounted by ridge cresting and a central turret. In its grouping there are a centre and two end blocks of six stories high, but the connecting wings are only five stories high. A stone portico in the centre of the structure forms the principal entrance. On either side of the portico are bay-windows running up three stories high; between those on the first floor alcoves are arranged, and on the second floor there are balconies. Angle bays or turret windows, carried up four floors high, are constructed in the end blocks. Balconies have been erected along almost the entire front on the first-floor level. The front is decorated with carved terra-cotta panels. The entrance-hall is 45 ft. long by 22 ft. wide. and 14 ft. 6 in. high, lighted by three stained-glass windows, reaching from floor to ceiling. The floor is laid with oak parquetry, and the walls are decorated with "anaglypta," and with a high dado of reeded pattern. The whole of the woodwork of the hall is of walnut, and the doors are fitted with embossed plate-glass panels. The supporting columns are of polished walnut, and the panels are enriched by "gesso" work. Facing the main entrance is the manager's room, and to the left is the hotel bureau or inquiry office. On the right hand is the grand staircase, constructed of polished walnut with teak treads and risers. The stairs are 6 ft. broad, and ascend by easy flights to the various floors. The staircase is lighted by stained-glass windows in the day, and at night by gas from a central ornamental wrought-iron suspended light, and light in the newels top. A corridor branches off to the left and gives access to the dining-hall, which is 55 ft. long by 34 ft. wide. Its floor is of oak and walnut parquet; the walls are hung to the dado line with anaglypta of a maroon colour; above the dado there is a green and gold Japanese paper, and above the picture-rail a similar frieze in lighter tones. The projecting piers which form the walls into bays are faced with alabaster pilasters. The ceiling is coffered and enriched. The windows are filled with plate-glass in the lower portions, and with stained glass in the upper portions. Interest is given to the apartment by the fact that in each window is inserted the arms of an important city or town in the United Kingdom. There are three fireplaces, with carved walnut chimney-pieces. Opposite the dining-hall is the drawing-room, 38 ft. long by 20 ft. wide, lighted by three large, semi-circular headed windows, which contain coats-of-arms, and are also decorated with a design in sea-weed and sea-shell. Panelled pilasters, painted and decorated, divide the room, and the ceiling is panelled. In addition to a reading-room and private sitting-room are smoking and billiard rooms. The smoking-room is 30 ft. long by 18 ft. wide, and has an angle-turret. The walls are hung with Spanish leather. The woodwork is coloured in peacock-blues and greens, and the ceiling is ribbed. The billiard-room has an open roof and lantern-light, 36 ft. long by 28 ft. wide and 15 ft. high to the tie-beam. Adjoining the billiard-room is a porter's or luggage-room, with lift, and adjacent to it is a gentlemen's lavatory. At the head of the staircase is a landing, opening to a corridor 6 ft. wide, which stretches along the entire length of the building, and is lighted by windows at each end, from which, on either side, access is obtained to the various sitting and bed-rooms. The description of one bedroom-floor applies to all the rest. There are four sitting-rooms and fifteen bedrooms on the first floor, beside bath-rooms and other adjuncts. In the basement are the various stores, cellars, and offices. The kitchen is central, large, and well-lighted, with open roof, and is situated at the rear of the building. The laundry, also at the rear, is fitted by Bradford's, of London. The building is served with water from the Cromer Water Works; besides which, the hotel has a private well of its own, with force-pump to fill a 1,000 gallon tank at the top of the building. A passenger luggage lift works from basement to top floor, and a service stairs is likewise provided. The sanitary arrangements have, it is stated, been carried out upon the most improved and modern principles. Messrs. J. Youngs & Sons, of Norwich, were the

contractors for the work. The carved stonework was executed by Mr. Minns, of Norwich; and the moulded brickwork was supplied by Mr. George Gunton, of Costessey. The parquet flooring was laid by Messrs. Turpin, of London; and the heating apparatus provided by Heim, of London and Vienna. The stoves and ranges, and most of the chimney-pieces and tile hearths, and fenders, and hot-water appliances, were supplied by Messrs. Theobald, Johnson, & Burton, of Norwich. The stained-glass and decorative painting have been executed by Messrs. J. & J. King, of Norwich. Messrs. Sturgess & Towlson have supplied the luggage and dinner lifts. The architects were Messrs. George J. & F. W. Skipper, of Norwich.

FOREIGN AND COLONIAL.

France.—Paris has just gained a new public square which has been arranged around the Musée Galliera, in the Trocadéro-avenue.——At the Louvre a new gallery has just been opened for the drawings of eminent architects. It already contains works by Percier, Baltard, Hippolyte Lebas, Hugo, Labrouste, &c.——The Minister of Public Instruction is about to create, at Limoges, at the Dubouché Museum, a new section under the title of "Section des Emaux." It will contain signed pieces of work, for the most part, by the most celebrated artists of Limoges.——M. Yves Guzot, Minister of Public Works, has opened, at La Corrèze, the new railway line from Brive-la-Guillarde to Cahors.——There has been inaugurated at Pulligny a monument to the memory of the volunteers killed in the Franco-German war.——M. Martenot, architect, of Rennes, and one of the most active members of the annual congresses held by the Société Centrale, has been appointed corresponding member of the Académie des Beaux-Arts, for the western district of France. M. Martenot, a former pupil of Lefuel, has carried out important works at Rennes for thirty years past, and has shown ability both as an administrator and as a decorative designer.——A new railway line is to be opened between Guerche and Châteaumeillant.——The double bridge "De la Bombe," near St. Omer, has recently failed. It was an iron girder bridge on iron columns, and was constructed in 1881. It will be six months before the bridge can be renewed.——The town of St. Brieue has opened a competition for a building for the archives of the Department of the Côtes du Nord.——The Society of Architects of Aube has lost one of its most active members, M. Eusèbe Desportes, architect at Nogent-sur-Seine, who has died at the age of sixty.——The death is announced, at Raincy, of M. Louis Alfred Chaudet, at the age of seventy-nine. He was a pupil of Huyot and of the Ecole des Béaux-Arts, and in 1849 gained the Prix Deschaumes for his work on the Propylæa of Athens. He was Inspecteur des Travaux at the Palais de Justice under Duc, and vice-president of the section of architecture at the Salon.——The landscape-painter, Pélouze, has just died at the age of fifty-three. In him the French school of painting loses one of its most admirable and gifted landscape-painters. He left unfinished a large decorative panel intended for the Hôtel de Ville. [The preceding portion of these notes was unavoidably postponed from last week.]——The jury appointed by the Académie des Beaux-Arts to decide the Grand Prix de Rome has given its judgment in regard to the architectural section, and awarded the first prize to M. Eustache, the second to M. Paul Normand.——The death is announced of M. Alphonse Ouri, painter, at the age of sixty-three. He was a pupil of Gosse, and had carried out a great deal of work under Eugène Delacroix, who entrusted to him the decoration of the Salon de la Paix at the Hôtel de Ville. Among other decorative work which he carried out may be mentioned the Salon Vert at the Tuileries, the Hôtel Fould, that of the Jockey Club, &c.——M. Cavélier, sculptor, has presented to the Louvre a remarkable little figurine from Tanagra, representing a veiled singer.——An industrial exhibition is about to be organised at St. Etienne by M. Lamaizière, architect.——The town of Parthenay has opened a competition for the construction of elevators to take up and distribute the waters of the Thouet for consumption.——There has been inaugurated at Montceau les Mines the statue of Jules Chagot who was the founder of the iron mills which have made the fortune of the district. The principal figure is in bronze, and allegorical figures are placed at the four angles.——The painter Willette, well known for his humorous illustrations, has organised, at l'Isle-Adam, an exhibition of his works. The proceeds are to go to the erection of a bust of Villiers of l'Isle-Adam, an author who died a few months ago.——There have just been completed, near Calais, the preparations for the immersion of a cable which is to form a second submarine telegraph between Denmark and France.——General Oudinot of Reggio, who died recently at Versailles, has left to the Museum of Bar-le-Duc his splendid collection of arms, including some pieces of historic interest and of great artistic value.——The dismantling of the fortifications of Douai has been commenced.——The pedestal of the monument to Gambetta at Ville d'Avray is now finished. The monument is situated behind the house in which Gambetta died, and in a few days the statues are to be placed, which have already been seen in the Salon. The monument will be inaugurated in October.

New Theatre in Melbourne.—According to the *Daily Chronicle*, the Opera House Proprietary Company have decided to build a new theatre and hotel on the site of the Opera House in Bourke-street, Melbourne. The design accepted by the directors is that of Mr. H. Pitt, architect, of Collins-street, and is of the Moresque style. The front portion of the ground abutting on Bourke-street will be occupied by the hotel, which will have a façade in the Classic style. The new theatre will seat 3,000 people, and will have stalls on the ground floor, and above the dress circle, family circle, and amphitheatre. The cost of the building will be about 30,000*l*.

MISCELLANEOUS.

The Crystal Palace Electrical Exhibition.—The Directors of the Crystal Palace, in deference to the wish of the Electrical Trade Section of the London Chamber of Commerce, have decided to postpone the opening of the Electrical Exhibition from November, 1891, till January 1, 1892, on which date the Exhibition will be formally opened. We understand that the Chamber of Commerce proposed a further postponement, but the directors, anxious as they were to meet their views, could not agree to a later date than January 1 without breaking faith with a large number of exhibitors who have applied for space, and who are now preparing their exhibits. It will be gratifying to intending exhibitors to learn that, with the view of promoting the success of the Exhibition, the Chamber of Commerce have agreed to appoint a Committee to act with the Directors of the Crystal Palace Company. A number of well-known scientific gentlemen have consented to act as an Honorary Council of Advice.

Parliamentary Sanitation. — By a curious coincidence the defective sanitary arrangements of the Chamber in which the French Deputies meet has been engaging the attention of a special Committee at the same time that similar defects in the House of Commons have been occupying the leisure of a Parliamentary Committee in this country. The French Chamber seems, however, to be in a worse state than our own, for Professor Emile Trélat, who has written a special report on the subject for the Committee, expresses the opinion that the only way to remedy matters is to pull the present building down and erect another on an adjacent site. The Chamber, he says, is defective in every respect; it is, in particular, too small. Deputies are so crowded that they are bored (*gênés*) by their neighbours, have no place to keep their papers, are unable to communicate with each other, and cannot hear the speakers. The Chamber, he said, "is unhealthy, for the occupants are condemned to breathe a foul atmosphere, and to endure too high a temperature." It is impossible to read M. Trélat's report, which is published in the *Revue d'Hygiène*, without perceiving that he believes that the work of the Chamber would be carried on with less heat, and with fewer of those "scenes" which now sometimes detract from its dignity, if the surroundings of the Deputies were more healthy and more conducive to comfort of body and tranquility of mind.—*British Medical Journal*.

A Church Struck by Lightning at Blackhill.—On the 3rd inst. a thunderstorm swept over the Consett district, and lasted for some hours. A considerable amount of damage has been done by the storm. The lightning struck a tall ventilating spire on the roof of St. Aidan's Church, Blackhill, Durham, twisting it out of shape, and also tore some of the slates from the roof.

Sculptures, St. George's Hall, Liverpool.—Mr. T. Stirling Lee has been for some time engaged upon the models for his series of sculptures, "The Progress of Justice," destined for St. George's Hall, Liverpool. He has four of them in hand, and has one, "The Administration of Justice," completed in the clay.—*Liverpool Post*.

Surveyorship, Redditch.—At a meeting of the Redditch Local Board, held on the 11th inst., Mr. J. Favell Thorrold was appointed Surveyor and Inspector in the place of Mr. S. Elgar Thorrold, who has resigned office under the Board.

London and County Banking Company.—As will seen by an advertisement which appears in our columns this week, at the half-yearly general meeting of the London and County Banking Company, Limited, held on the 6th inst., the Directors submitted the balance-sheet for the half-year ending June 30 last, which showed that the net profits amounted to 229,826*l*. 9s. 6d. An interim dividend for the half-year of 11 per cent. was declared.

Sale of Building Land in Plots at Hastings: The St. Helens Park Estate.—Messrs. E. & H. Lumley, of London, held a highly successful sale of land on the 13th inst. at the St. Helens Hotel, St. Helens Park, Hastings. The estate, which comprises about 100 acres, was purchased some years ago by four gentlemen of Hastings, who have allowed the land to remain without much effort to realise it until now, when they called in Messrs. E. & H. Lumley, who advised immediate action, as they considered the time had arrived when the land was ripe for development and distribution among purchasers. Mr. Humphreys, architect, Hastings, in conjunction with Messrs. Lumleys, designed a plan of roads and plottings suitable to the conditions and formation of the ground. Some of the best plots realised high prices, the general average being from 400*l*. to 600*l*. an acre, and it is expected that is the sales proceed (for it is intended to hold another sale soon, to be followed by similar proaeedings at fixed periods), these prices will be encreased.

Opening of Recreation Grounds, Lichfield.—On the 22nd ult. the new recreation grounds at Lichfield, the gift of the Corporation, were opened by the Mayor (Alderman S. Haynes). These grounds, which stand in a pleasant position in the rear of the museum, are nearly five acres in extent.

Planing and Moulding Machine. — Messrs. Sagar & Co. send us an illustration and description of a new machine, one of the patented improvements in which consists in a positive lateral motion of the bottom of the chipper-block with its carriage, so that there is a draw-cut to the revolving cutter. Another patented feature is a dead-weight chip-breaker working in connexion with the side cutter-heads.

Roofing Tiles and Sanitary Ware.—We have received from Messrs. F. Rosher & Co., of Old Jamaica Wharf, Blackfriars, Chelsea, and elsewhere, their new illustrated catalogue of roofing tiles, ridge tiles, finials, &c., in red, blue, and Broseley ware. These goods are made in great variety, and enjoy a well-earned repute for excellence of quality. Their blue terro-metallic bricks, their stable-paving bricks, and adamantine clinkers, are also well worthy of attention, as are their Suffolk white and red moulded and ornamental bricks. Chimney-tops in terra-cotta and red ware, flue pipes, &c., are shown in great variety. The catalogue also figures a large variety of vitrified stoneware goods, including kitchen sinks, drain-pipes, traps, gullies, &c., as well as a large variety of sanitary earthenware goods, including closet-basins, lavatories, urinals, &c. We are sorry to see, however, that the old and highly insanitary pan-closet is figured on one of the pages of the catalogue; this appliance has long ago been condemned as unworthy of use. The catalogue also includes illustrations of encaustic, mosaic, tesselated, and decorated tiles, as well as garden statuary, consoles, balustrades, vases, pedestals, and fountains. It will be found a very useful catalogue for reference, as it well illustrates the several specialties for which the firm issuing it has long been favourably known.

Crystal Palace School of Practical Engineering.—On the 8th inst., Sir Guilford Lindsay Molesworth, K.C.I.E., Member of Council Inst. C.E., and late consulting engineer to the Government of India for State Railways, took the chair in the Crystal Palace School of Practical Engineering on the occasion of distributing the certificates awarded by the examiners to successful students for the summer term. Among those present on the platform were Mr. A. T. Walmisley, Past-President Inst. S.E.; Mr. R. J. Mosse, late Director of Public Works and of State Railways in Ceylon, &c. The proceedings were conducted in the new lecture theatre of the institution. The report of the examiners having been read, Sir Guilford Molesworth delivered an address, which he commenced by describing the usual course open to an intending student of civil engineering, and he defined the Crystal Palace School as efficiently meeting a distinct want, that it adequately satisfied. In expressing the thanks of the directors to the officiating examiners, Mr. A. D. Fox, M.Inst. C.E., and Mr. R. J. Money, A.M.Inst.C.E., Mr. Samuel Green, director, took occasion to suggest the formation of a society or league of old students, a proposition which was well received. — The examiners replied, and, after a few observations by Mr. J. W. Wilson, the proceedings closed with an expression of thanks to the chairman for presiding.

The Junior Engineering Society: Summer Excursion, 1891.—The following is the programme of this excursion:—Saturday, August 15: Leave London, King's Cross, 2.30 p.m. for Scarborough. Monday, August 17: Visit Messrs. Bell Brothers' Lumpsey Ironstone Mines and Clarence Blast Furnaces. Tuesday, August 18: Visit Sir Raylton Dixon's Shipbuilding-yards and other works at Middlesbrough. Wednesday, August 19: The Hartlepools. Visit to the Central Marine Engine Works and Shipbuilding-yards of Messrs. W. Gray & Co.; the N.E. Railway Docks, &c.; the British Metal Expansion Company's Works; the Works of the West Hartlepool Steel and Iron Company, and of the Seaton Carew Iron Company. Thursday, August 20: Visit to the Docks, Sunderland; the River Wear Commissioners' Testing Works; the Roker Pier Works; Messrs. W. Doxford & Sons' Marine Engineering Works. Trip up the river in the afternoon. Friday, August 21: Darlington and Stockton. Visit to the N.E. Railway Works; the Darlington Forge; Messrs. W. Whitwell and Company's Thornaby Ironworks; trip down the river in the afternoon to see the Tees Conservancy Commissioners' improvements. Second summer dinner of the Society in the evening at Middlesborough. Saturday, August 22: Visit the Grange Ironworks; Durham Cathedral and Castle.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised	Premium.	Designs to be delivered.
*Port Talbot Technical, &c. Schools	Building Committee..	Not stated.....	Sept. 10
*Additions to Municipal Buildings.....	Bath Council	100l. 75l. 50l.	Oct. 10

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Making-up, Kerbing, &c. Roads.....	Billericay U.R.S.A. ..	*Official*.....	Aug. 15
*Opening and Fixing Fifteen Windows, &c.	Whitechapel Union ..	Bruce J. Capell	Aug. 18
School-room, Class-rooms, &c. Polsham ..	Paignton School Board	W. G. Couldrey	do.
Master's Residence	do.	G. S Bridgman	do.
Trench Cutting and Laying Sewer Pipes..	Merthyr Tydfil L. B...	T. F. Harvey	do.
Water Mains	Rotherham Corporatn	*Official*	do.
Limestone Road Metal (500 tons)	Tredegar Loc. Bd.	do.	do.
Bar Iron and Steel	Madras Railway Co...	do.	do.
Boilers, Engines, &c.	Rotherham Corporatn	do.	do.
Cottage, Great Aish, South Brent.....	J. R. T Kingwell	.....	do.
School, Field Hill.....	Batley (Leeds) Sch. Bd.	H. B. Buckley.....	Aug. 19
Sea Wall, Footpath, &c. Cockington	Devon County Council	C. G. S. Acock.....	Aug. 20
Road Works	Durham and Chester-le-Street High. Bd...	Wm. McGregor	do.
Concreting Paths	Leeds Corporation....	*Official*	do.
School and Master's House	Llanharran(Glam)Sch. Bd.	P. G. Thomas	do.
Boiler House, Tall Chimney, &c.	Dewsbury Union	Holtom & Fox.....	do.
Dwelling-house, Stables, &c. Dursley, Glos.....	R. A. Lister.....	J. F. Trew.....	do.
Seven Dwelling-houses and Premises Anvil-street, Brighouse	.....	G. Hepworth & Son ..	Aug. 21
Paving and Kerbing, Palmerston-street ..	Bollington (Macclesfield) Local Board ..	*Official*.....	Aug. 22
*Wood Paving Blocks	Norwich Corporation	P. P. Marshall.....	do.
*Brick Culvert with Manholes, &c.....	Hornsey Local Board	T. de Courcey Meade..	Aug. 24
Trench Cutting and Laying Water-pipes	Elland Local Board ..	G. & G. H. Crowther..	do.
Burial Ground, Mortlach, Dufftown, N.B.	Parochial Board.....	*Official*	do.
School, House, Additions, &c. to Present School, Pontypool	Trevethin Sch. Board	E. A. Lansdowne	do.

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Ten Cottages, Caerphilly, Cardiff	Caerphilly Cottage Building Club	Phillips & Holdgate ..	Aug. 24
*Steel Joist and Girders	Edmonton Local Bd.	G. E. Eachus	Aug. 25
*Chalk or Pit Flints	Kingston-upon-Thames Corp.	*Official*	do.
*Main Outfall Sewers Works	Ystradyfodwg L. B. ..	J. W. Jones	Aug. 27
*Enlargement of Workshops at Workhouse	Kensington Guardians	T. W. Aldwinckle	do.
*Sewerage Works	Dorking Union	W. Rapley, Jr.	do.
*Painting, &c. Works	Lewisham Union	*Official*	do.
*Four Houses, &c. at Galloway	Admiralty	do.	Aug. 28
*Broken Granite.....	Walthamstow L. B. ..	do.	do.
*Granite and Whinstone Setts	York Corporation	do.	Aug. 31
*New School Rooms and Laundry Extension	South Met Sch. Dist.	do.	do.
*High Level Sewer, &c.....	Belfast Corporation ..	do.	Sept. 1
*Works of Sewerage	Cuckfield Loc. Bd.....	J. Mansergh.....	Sept. 3
Dredging in Sutton Harbour, Plymouth..	Harbour Impt. Com...	J. C. Inglis	do.
*Sewerage Works.....	Sutton (Surrey) L. B.	J. Austie	Sept. 7
Extension of Cemetery, Jarrow	Hedworth, Monkton, & Jarrow Burial Bd.	J. H. Morton	do.
*Public Baths and Washhouses.....	Islington Vestry.....	A. Hassell Tiltman ..	Sept. 12
*Making-up Roads	Hornsey Loc. Bd.	T. de Courcy Meade ..	Sept. 16
*Public Conveniences, Hampstead	London C. C.	*Official*.....	Sept. 29
*Tunnel under River Thames, Blackwall..	do.	do.	Oct. 13
*Iron Railing	.....	C. J. Ferguson.....	No date
*Erection of Citadel, Harwich	Salvation Army	W. Gillbee Scott.....	do.
Iron Railings, East End Park	Leeds Corporation....	*Official*	do.
Band-room, &c. Lee Mount, Halifax.....	.....	Crowther & Thornton	do.
Shed, &c. Halifax	.....	Petty & Ives.....	do.
Fence Walling, near Lightcliffe, Halifax..	.....	Horsfall & Williams ..	do.
Residence, and Alteration to Premises, Beeston, Hill, Leeds	Wm. Westerman	C. F. Wilkinson.....	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*Clerk of Works	Walthamstow L. B. ..	Not stated.....	Aug. 19
Surveyor of Roads, &c.	Morpeth U. S. A.	104l.....	Aug. 24

Those marked with an Asterisk (*) are advertised in this Number. *Competitions, p.* i. *and* iv. *Contracts, pp.* iv., vi., *and* viii. *Public Appointments, p.* xxii.

Lecture-hall, Exeter.—On the 23rd ult., a new lecture-hall, in connexion with the Exeter Literary Society, was opened in Barnfield-road, Exeter. The exterior of the building is in the Italian style, and consists of moulded white bricks with terra-cotta dressings. The interior is 64 ft. long, 39 ft. wide, and 36 ft. in height. The platform is 15 ft. long and 21 ft. wide, and the balcony is 37 ft. by 15 ft. At the rear of the hall, in which 600 persons can be seated, is a movable floor that is capable of being raised 2 ft. There are cloak-rooms at the rear, and retiring-rooms on each side of the platform. The balcony has six tiers, raised 8 in. above each other. Store-rooms have been provided under the building, and there is a long glass shelter outside the building, 7 ft. wide, for protection in wet weather. The work has been carried out by Messrs. Stephens & Son, of Exeter, in accordance with plans prepared by Mr. J. M. Pinn, Exeter, at a cost of 2,000*l.*

The Forest of Savernake.—On Monday last, Mr. Justice Stirling dismissed an opposed petition made by the Marquis of Ailesbury, under the Settled Land Acts, 1882-90, for an order of the Court sanctioning the purchase by Lord Iveagh of the Savernake estates for 750,000*l.* The home demesne, of nearly 7,800 acres, includes the Forest and Tottenham Park. The latter was assigned *temp.* Henry III. to Queen Eleanor for her jointure, and has so been held by several queens consort. Granted to the Seymour family, it passed, together with the Forest, to Thomas, second Earl of Ailesbury, by his marriage with Elizabeth, sister and heir to William Seymour, third Duke of Somerset, in 1676. Near to Tottenham Park is Wolf Hall, a hunting seat of Sir John, father to Jane, Seymour, and the "Protector" Duke of Somerset. Tradition has it that in the former house, whereof portions were incorporated in the new building, the marriage between Henry VIII. and Lady Jane was solemnised. Richard, Earl of Burlington, is the reputed architect of the house at Tottenham Park, consisting of an Ionic portico upon a rustic base, with balustrade above, and four brick angle-towers,—to which centre two wings were subsequently added. See the plate in J. P. Neale's "Seats," First Series, vol. V. The estates under cultivation comprise about 30,000 acres, together with various holdings, and property in Marlborough. The priory at Easton, near to Wolf Hall, established, it is said, in the twelfth century, was granted at the Dissolution to Sir Edward Seymour, afterwards first Duke of Somerset. The forestership of Savernake was held by a horn, richly enamelled, and made out of an elephant's tusk, from the days of Henry II.

Discoveries of Roman Remains at Lincoln.—The remains of a stately Roman villa have just been laid bare by the miners employed at the Mid-Lincolnshire Ironstone Company's works at Lincoln. From the extent of the tesselated pavements laid bare, there is hardly any doubt that in centuries long gone by there stood a Roman mansion on the site, which for magnitude was perhaps unrivalled in England. From time to time extensive basement floors have been laid bare, and, from tentative explorations which have just been made, still more floors remain to be uncovered. One of these patches of pavements just discovered extends 48 yards northward, from what might be called the main building, which had previously been broken up. The strip is 13 ft. in breadth, and down its centre is an intricate key-pattern worked in blue tesseræ. On each side of this run alternately broad ribbons of white and narrower ribbons of red tesseræ. There is another strip of pavement to the south of the above patch, which has been laid bare to the extent of 27 yards. This piece is 10 ft. wide, and its western position is cut up in neat patterns, which shows that they formed the floors of rooms. It is evident that, from the eastern extremity of these floors, another long strip of 48 or 50 yards still remains to be uncovered. All the floors are no deeper than from 18 in. to 30 in. below the surface of the soil. Mr. Ramsden, the manager of the works, is keeping a coloured plan of the whole of the pavement.—*Leeds Mercury.*

Civil and Mechanical Engineers' Society.—On July 31, by the kind permission of the Chief Engineer to the Great Eastern Railway Company, the members of this Society were permitted to visit and inspect the alterations at Liverpool-street Station. The party, which included Mr. W. C. Street, Messrs. T. W. Sweet, H. Coward, S. à Court, Hon. Sec., and others, were met by Mr. T. Wilson, the Chief Engineer of the Company, who showed them the plans of the works and a scale model of the new station, explaining the alterations and details. The works, when finished, will give the Great Eastern Railway the finest station in London, practically doubling the existing terminus. There will be two new lines of rails, one up and one down, thus giving six approach lines, branching out in the station into eight new lines along platforms for loading and unloading passenger trains, which, together with existing lines and alterations to be made in the present station, will give twenty lines of rails in all, of which eighteen will be platform lines, besides a parcels office, 197 ft. by 60 ft., and an addition to the hotel of 130 bedrooms, a large hall for holding public meetings in and other purposes, and many large reception-rooms. The whole work was designed by and is being carried out under the direction of Mr. Wilson, who was, it will be remembered, Resident Engineer when the existing station was being built. After thanking Mr. Wilson for his great kindness and attention, the party were shown over the actual works in progress by Mr. C. Holme, Assistant Resident Engineer, who piloted them through, over, and under the works in hand. Among other curiosities discovered in lowering the ground were a stone coffin, two human skulls, and some pottery. On arrival at Stratford the party were met by Mr. Holden, the Great Eastern Railway Locomotive Superintendent, who kindly conducted them through the shops, including the testing department, passing, among other tools, a new pattern twist drill grinder, which was designed by one of the party. In the testing department were seen samples of driving axles and cast-steel wheels tested to destruction with high results, and a new model motion for indicating valve gears, claimed considerable attention. The party were then shown the liquid fuel-burning apparatus invented by Mr. Holden, and used on several of the stationary boilers and furnaces in the works. The system was also shown in operation on an express locomotive, which was booked to take the Continental (Parkeston) express that night. The apparatus is simple, reliable, and regular in working. The liquid fuel (a mixture of green oil and gas tar) is injected as spray into the firebox by two injectors over an incandescent bed of solid fuel or cinders laid on the bars to exclude the admission of air from beneath. The combustion is complete, owing to a ring jet of steam controlled by the driver inducing atmospheric air in close proximity to the stream of liquid fuel. The cost of the application of the system is slight, as no structural alterations are required. The saving in fuel is considerable, and the labour in dealing with it, stoking, &c., is reduced to a minimum. At the present prices of coal and liquid fuel, a saving of some 15 per cent. is effected in regular working. After being conducted through the carriage department, the party were shown the oil-gas producing plant for lighting the carriages. A hearty vote of thanks to Mr. Holden terminated the visit, and the party returned to London.

South Kensington Museum.—We are requested to state that the designs submitted in competition for the completion of the buildings of the South Kensington Museum are now on view at that Museum from 10 till 6.

MEETINGS.

Saturday, August 15.

Architectural Association.—Annual Excursion, Shrewsbury (concluded)

International Congress of Hygiene and Demography.—Meeting in London (continued).

Royal Archæological Institute.—Annual Meeting, Edinburgh (continued).

Junior Engineering Society.—Summer Excursion week commences.

Glasgow Architectural Association.—Visit to Dunblane Cathedral.

Monday, August 17.

Royal Archæological Institute.—Annual Meeting, Edinburgh (continued).

Tuesday, August 18.

Royal Archæological Institute.—Annual Meeting, Edinburgh (concluded).

Friday, August 21.

Civil and Mechanical Engineers' Society.—Visit to Printing Works, Aylesbury.

CAPITAL AND LABOUR.

The Lock-out of Carpenters and Joiners.—There is nothing fresh to report this week, except that the following letter has been addressed by the Masters' Association to the Secretary of the operatives:—

"The Central Association of Master Builders of London,
31 and 32, Bedford-street, Strand, W.C.,
London, August 6, 1891.

Mr. S. F. Watts, Secretary,
Carpenters and Joiners,
10, Agar-street, W.C.

Dear Sir,—I am directed to inform you that at a meeting of employers held to-day, it was unanimously decided that the course of action hitherto pursued be maintained, and that the proposals made at the late conference, in the hope of settling the present dispute, not having been accepted, be, and are hereby, withdrawn.—I am, dear Sir, yours truly,

E. S. Henshaw,
Secretary."

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

14,139.—Fireplaces: *J. Taylor and others.*—Instead of allowing the flames and smoke to pass at once from the firegrate up the chimney, the products of combustion are, according to this invention, caused to pass through openings or flues at the back, sides, and top of the grate, and conducted over the heated back plate of the grate, then allowed to escape up the chimney. By this means a large heating surface is obtained with economy of fuel.

312.—Tiebricks: *F. W. Holloway and E. P. Bastin.*—This invention consists of a tie of three bricks, two of unequal size and the third forming a bond to the other two, for use more especially in constructing the angular piers of bay windows.

5,734.—Hinging Doors and Casements: *J. Humphrey.*—To take off the weight from the butts, a pivot and socket is fixed to the door and the floor, forming a centre and support.

9,578.—Ventilators: *J. D. Fryer.*—The hollow base or shaft has openings formed in the side with hoods over them, and so shaped that the air is deflected in an upward direction inside the shaft. A second inner shaft is fitted and a revolving head only permits the openings on one side to be open or clear at a time.

9,733.—Shutters for Fire Grates: *W. H. Vance.*—Steel shutters are, according to this invention, fixed in front of the grate so as to be drawn when it is desired to regulate the combustion. They are of an ornamental appearance, with provision for ventilation, so that in summer, when the grate is not used, they may be drawn across the front of the stove or grate.

NEW APPLICATIONS FOR PATENTS.

July 27.—12,741, S. Barrass, Window-sash Fasteners.—12,744, J. Gibson, Flooring Cramps.—12,748, L. Covilband, Draught Excluders for Doors and Windows.

July 28.—12,760, J. Pullan and others, Brick-pressing Machines.—12,762, W. Morton. Ornamental Panels or Decorating Materials for Walls, Ceilings, &c.—12,769, J. Rhodes, Springs and Checks for Closing Doors.—12,790, T. Bass, Shutter and Door Fasteners.—12,791, H. Henley, Spring Lock Window Fastener.—12,806, J. Mactear and D. Sutherland, Treatment of Stone for Hardening the same.—12,810, H. Newton, Augurs and similar Tools.

July 29.—12,849, K. Sutherland and G. Esdaile Gimlet.—12,852, F. Pover, Ovens and Kilns for Firing Bricks, Tiles, &c.—12,891, J. Harris, Siphon Flushing Cisterns.

June 30.—12,911, S. Johnson, Mortise Lock-holder.—12,912. W. Egglestone, Sanitary Maps.—12,930, S. Hill and R. Hodges, Door-closing Springs and Checks.—12,949, S. Shirtcliffe and W. Angus, Flush Bolts.

July 31.—12,972, L. Johnstone, Heating Buildings by Steam.—13,010, J. Carr, Roofing Tiles and Method of Fixing Same.—13,016, G. Williams, Hydraulic Cement.—13,037, S. Jennings and J. Morley, Water-closets, &c.

August 1.—13,059, W. Hughes and C. Young, Fastening and Unfastening Fanlights, Windows, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

9,816, H. Cracknell, Door-knocker.—10,036, C. Calot, Varnish.—10,168, J. Parkinson, Obtaining Lime from Limestone, and applicable also in the making of cement, whereby the recovery of the carbon dioxide evolved can be effected.—10,659, J. Walker, Kitchen Boilers.—10,718, W. Ley, Sash-fasteners.—10,723, D. Terry and W. Teeple, Nut-locks.—10,774, T. Bailey, Sash-fasteners.—10,986, J. Horsey, Heads of Screws.—11,585, G. Brindley, Syphon Cisterns and Water-waste Preventers.—11,729, G. Hatton, Handles for Door-latches.—12,184, J. Killick and G. Longthurst, Sheet-metal Roofing.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

6,018, C. Henshaw, Ventilators.—8,550, G. VanWinkle, Locks and Latches.—10,046, T. Crump and Others, Valve and Water-waste Preventer combined for Fixing in Flushing-cisterns.—10,473, T. Salter, Siphon-cisterns.—10,959, W. Drayson, Lavatory-basins.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 4.—By *H. Gibson*: 4 and 5, Crescent-ter., Clapham, u.t. 58 yrs., g.r. 5*l.*, 460*l.*—By *Debenham, Tewson, & Co.*: 18 and 19, White Hart-st., Strand, f., area 630 ft., 1,400*l.*; "Ripney Hill Farm," near Sheerness, 130a. 0r. 15p., f., 1,350*l.*

August 5.—By *Blake, Haddock, & Carpenter*: "Waddon Marsh Farm," Croydon, and 85a., f., 11,800*l.*—By *P. D. Tuckett*: 136 138, and 140, Croydon-rd., Anerley, u.t. 84 yrs., g.r. 43*l.* 10s., 1,060*l.*; 52, Gibbon-rd., Nunhead, u.t. 79 yrs., g.r. 5*l.*, r. 40*l.* 400*l.*; 79 and 81, Evelina-rd., f., r. 70*l.*, 825*l.*; 71 to 77 (odd), Evelina-rd., f., r. 132, including mortgage, 1,473*l.*—By *Rutley, Son, & Vine*: 16, Ampthill-sq., Hampstead-rd., u.t. 52 yrs., g.r. 10*l.* 10s., 785*l.*; 20 and 22, Augustus-st., Regent's-pk., u.t. 27 yrs., g.r. 2*l.*, r. 59*l.*, 500*l.*; 29, High-st., St. John's-wood, u.t. 10 yrs., g.r. 3*l.* 10s., r. 42*l.*, 125*l.*

August 6.—By *Newbon & Co.*: 91, Richmond-rd., Dalston, u.t. 54 yrs., g.r. 6*l.* 5s., r. 45*l.*, 425*l.*; 64, Mildmay-grove, Stoke Newington, u.t. 72 yrs., g.r. 7*l.*, 355*l.*; 65, Campbell-rd., Seven Sisters'-rd., u.t. 76 yrs., g.r. 7*l.*, r. 28*l.* 12s., 100*l.*; 20, Almington-st., Hornsey, u.t. 79 yrs., g.r. 6*l.*, r. 35*l.* 2s., 190*l.*; 45, Linton-st., Arlington-sq., u.t. 36 yrs., g.r. 4*l.* 4s., r. 34*l.*, 265*l.*; 15, Gerrard-st., Islington, u.t. 42 yrs., g.r. 6*l.* 6s., 405*l.*—By *Humbert, Son, & Flint*: 20 and 22, St. John's-rd., Clapham, u.t. 53 yrs., g.r. 8*l.*, r. 95*l.*, subject to rent charge, 1.050*l.*; a plot of freehold land, 5a. 2r. 3p., Mill-hill, N.W., 1,400*l.*; enclosures of freehold meadow land, 19a. 0r. 6p., Northaw, Herts., 1,350*l.*; a freehold dwelling-house, 400*l.*

August 7.—By *Hopkins & Co.*: 16, 18, and 20, Church-st., Lisson-grove, u.t. 30 yrs., g.r. 30*l.*, r. 160*l.*, 1,060*l.*; 22 and 24, Church-st., u.t. 30 yrs., g.r. 20*l.*, r. 110*l.*, 860*l.*; 38, Church-st., u.t. 30 yrs., g.r. 10*l.* 10s., r. 55*l.*, 470*l.*—By *Prickett & Venables*: 7 and 8, Leonard-ter., Willesden, u.t. 91 yrs., g.r. 13*l.*, r. 60*l.*, 420*l.*; 8, Clifton-rd., Clapton, u.t. 980 yrs., g.r. 5*l.* 5s., r. 42*l.*, 260*l.*; the f. residence, "Walfield," and 5 acres, High-rd., Whetstone, 2,780*l.*—By *Baker & Sons*: 11, Gough-sq., and 3a, Bell-ct., Fleet-st., u.t. 74 yrs., g.r. 42*l.*, 750*l.*; 5, 7, and 9, Chesilton-rd., Fulham, u.t. 88 yrs., g.r. 24*l.*, r. 110*l.*, 900*l.*; 11, 17 to 23 (odd), and 45, Chesilton-rd., u.t. 88 yrs., g.r. 48*l.*, 1,740*l.*; 52, Radipole-rd., u.t. 87 yrs., g.r. 8*l.*, r. 35*l.*, 290*l.*

[*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G. ton	8/0/0	9/0/0
Teak, E.I... load	8/0/0	14/0/0
Sequoia, U.S.ft.cu.	2/3	3/0
Ash, Canada load	2/5/0	4/0/0
Birch, do.	2/5/0	4/5/0
Elm, do.	3/5/0	4/15/0
Fir, Dantsic, &c.	2/0/0	3/10/0
Oak, do.	2/10/0	4/10/0
Canada.....	4/17/6	6/10/0
Pine, Canada red	2/10/0	3/10/0
Do, yellow	2/0/0	5/0/0
Lath, D'ntsic, fath	5/0/0	6/0/0
St. Petersburg	5/0/0	7/0/0
Deals, Finland, 2nd & 1st std 100	7/15/0	10/0/0
Do, 4th & 3rd..	7/5/0	8/5/0
Do. Riga	6/5/0	7/15/0
St. Petersburg, 1st yellow ..	9/15/0	14/0/0
Do. 2nd yellow	8/5/0	9/5/0
Do. white	6/15/0	10/0/0
Swedish	6/15/0	15/10/0
White Sea	8/5/0	17/0/0
Canada, Pine 1st	12/10/0	24/0/0
Do. do. 2nd....	9/0/0	15/10/0
Do. do. 3rd, &c.	6/10/0	10/0/0
Do. Spruce. 1st	8/0/0	10/10/0
Do. do. 3rd & 2nd.....	6/0/0	7/10/0
New Brunswick	5/5/0	7/5/0
Battens, all kinds	3/10/0	15/10/0
Flooring Boards, sq., 1 in. prep. 1st	0/10/0	0/13/6
Do. 2nd.....	0/9/0	0/10/6
Other qualities	0/4/6	0/7/6
Cedar, Cuba ..ft.	/4	/4½
Honduras, &c.	/3½	/4½
Mahogany, Cuba.	/4½	/6½
St. Domingo, cargo av	/4½	/6½
Mexican do. do	/4½	/5
Tobasco do. do	/5½	/7
Honduras do..	/5½	/6½
Box, Turkey ton	4/0/0	13/0/0
Rose, Rio.....	10/0/0	20/0/0
Bahia	9/0/0	18/0/0
Satin, St. Domingo . ....ft.	0/0/9	0/1/3

TIMBER (*continued*).		
Porto Rico	0/0/10	0/1/6
Walnut, Italian..	0/0/3½	0/0/7

METALS.		
Iron—Pig, in Scotland .....ton	47/2/0	0/0/0
Bar, Welsh, in London.....	6/5/0	6/15/0
Do. do. at works in Wales	5/15/0	6/5/0
Do. Staffordshire, in London	6/5/0	7/0/0
Copper—British, cake and ingot	58/10/0	59/0/0
Best selected ..	59/10/0	60/10/0
Sheets, strong..	68/0/0	0/0/0
Chili, bars	52/2/6	53/0/0
Yellow Metal lb.	0/0/6	0/0/6½
Lead— Pig, Spanish ....ton	12/6/3	0/0/0
English, com. brands	12/10/0	12/12/6
Sheet, English, 3 lbs. per sq. ft. and upwards ..	14/10/0	0/0/0
Pipe	15/0/0	0/0/0
Zinc—English sheet .....ton	27/0/0	0/0/0
Vieille Montagne.....	27/10/0	0/0/0
Tin—Straits	91/5/0	91/15/0
Australian	92/12/0	93/5/0
English Ingots	0/0/0	0/0/0

OILS.		
Linseed .....ton	20/12/6	20/17/6
Cocoanut, Cochin	31/0/0	0/0/0
Do. Ceylon	26/10/0	0/0/0
Palm, Lagos	26/0/0	0/0/0
Rapeseed, English pale	31/15/0	0/0/0
Do. brown	30/5/0	30/10/0
Cottonseed ref...	21/0/0	0/0/0
Oleine	21/15/0	24/0/0
Lubricating, U.S.	5/0/0	6/0/0
Do. refined	8/0/0	12/0/0
Tar—Stockholm barrel	0/18/0	0/18/6
Archangel	0/12/6	0/0/0

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *noon on Thursdays.*]

BIRKENHEAD.—For sewering, forming a new street, and paving near Central Station, for the Corporation. Mr. Thos. C. Thorburn, C.E., Borough Surveyor, Town-hall, Birkenhead:—

L. Marr & Son	£2,648	11	5	Sterling & Swann, Manchester*	£2,090 0 0
W. F. Chadwick....	2,233	0	11		
Jos. Jones	2,167	8	5		

* Accepted.

BLACKWELL (Derbyshire). — For works in connexion with Blackwell and South Normanton Waterworks. Mr. Geo. Hodson, M.Inst.C.E., engineer, Westminster:—

H. Vickers.....	£4,170	6	5	Oliver & Co.	£3,770 10 0
Jenkins & Sons	4,094	8	5	Fotherly & Sons ..	3,764 12 4½
S. Burnham	3,996	7	10	J. Lane.....	3,750 0 0
F. J. Collingwood ..	3,955	0	0	Price & Shardlow ..	3,735 0 0
J. Bentley.....	3,880	0	0	Chas. Green, Wellgate, Rotherham*	3,517 0 0
J. Peattie	3,840	0	0		

* Accepted.

BRISTOL.—For the extension of Messrs. E. S. & H. Robinson's printing offices, Victoria-street, Bristol. Mr. W. Bruce Gingell, architect, Bristol:—

J. Wilkins & Son	£3,090	Stephens, Bastow, & Co...	£2,699
Neale Bros.....	2,955	Eastabrook & Son	2,695
Beachim & Balmont.....	2,846	W. Veals.....	2,644
Brock & Son	2,759	E. Love	2,580
E. T. Hatherly	2,757	E. Walters*	2,550

* Accepted. [All of Bristol.]

BRISTOL.—For erecting a warehouse for Mr. E. T. Lewis, Leek-lane, Bristol. Mr. W. Bruce Gingell, architect, Bristol:—

Forse	£2,700	E. Love	£2,320
Wilkins & Son.....	2,653	E. Walters.....	2,296
E. T. Hatherly	2,547	Neale Bros.....	2,211
Cowlin & Sons.....	2,437	Stephens, Bastow, & Co....	2,199
Brock & Son.....	2,409	Eastabrook & Son	2,194
Perkins	2,398	Beachim & Balmont	2,186
W. Veals	2,324		

BROMLEY (Kent).—For bar-fittings, pewtering, &c., at the "Swan and Mitre," Bromley, for Messrs. Nalder & Co. Mr. Fred West, architect:—

Simpson, Camberwell..... £290

CHELMONDISTON (Suffolk). — For the erection of bungalow and cottage, for Mr. W. F. Neave. Mr. H. J. Wright, architect, Ipswich. Quantities by the architect:—

Pells & Son	£995 0 0	C. Dunnett	£861 6 6
A. Coe.....	975 0 0	E. Wagstaff, Freston*	785 10 0
H. B. Smith.....	950 0 0		

* Accepted.

CHISLEHURST.—For additions to schools at Chislehurst, for the Right Honourable Countess Sydney. Mr. C. H. Worley, architect:—

Otway (accepted) £286 0 0

COVENTRY.—For the erection of new schools, in Brick-kiln-lane, Foleshill, for the Foleshill School Board. Mr. T. F. Tickner, architect, 7, Bishop-street, Coventry:—

Isaac	£3,518	Hill	£3,243
Greaves & Palmer	3,395	Kelley & Son.....	3,200
Haywood	3,355	Heatherley Bros.	3,187
Wright & Robinson	3,250	Garlick	2,800

DARTFORD.—For the erection of a carpenters' shop, &c., at Gore Farm Hospital, for the Metropolitan Asylums Board. Messrs. A. & C. Harston, Architects, 15, Leadenhall-street, E.C.:—

W. Johnson & Co., Ltd.	£171	T. Knight, Sidcup*	£170

* Accepted.

EAST STONEHOUSE.—For the formation of a roadway adjoining the reservoirs at Pounds, Pennycross, for the Local Board. Mr. J. L. Hodge, C.E., 22, Courtenay-street, Plymouth:—

E. Duke	£120 10 0
W. T. Jinkin, Plymouth (accepted)	110 0 0

EXETER.—For the erection of drill-hall and headquarters for the 1st Volunteer Battalion at Exeter. Mr. R. Stark Wilkinson, architect, 14, Furnival's Inn. Quantities supplied:—

J. Martin	£3,700	W. H. Gooding	£3,195
Stephens & Son	3,550	Hy. Phillips.....	3,170
Scadding & Son	3,250	Tree & Bolley (accepted) ..	3,094

[All of Exeter.]

EYEMOUTH, N.B.—For the construction of a new quay-wall, deepening channel in harbour, &c., for the Harbour Commissioners. Messrs. Thos. Meik & Sons, engineers, 21, York-place, Edinburgh:—

R. C. Brebner.....	£11,480	John Best.....	£10,700
John Jackson.....	11,300	Geo. Lawson, Rutherglen, Glasgow (accepted)	9,060
James Bain.....	10,725		

HALIFAX.—Accepted for the erection of a church institute and three department school, in connexion with Christ Church, Sowerby Bridge. Messrs. Horsfall & Williams, architects, Post-office-buildings, Halifax:—

Mason—Jno. Turner, Warley, Halifax	£2,436	10	0
Joiner—E. H. Boocock, West Vale, Halifax	944	10	0
Plumber, &c.—Jas. Stafford, Sowerby Bridge ..	315	0	0
Heating—Jas. Stafford, Sowerby Bridge	164	0	0
Slater and Plasterer—T. Dyson, Sowerby Bridge	268	0	0
Ironfounder—S. Wadsworth, Sowerby Bridge ..	65	0	0
Painting—B. Mallinson & Son, Sowerby Bridge.	65	0	0
Asphalt—Jas. Bullough, Hanover-st., Halifax ..	57	0	0

HEREFORD.—For the erection of two pairs of cottages for the County and City Asylum. Mr. W. W. Robinson, architect, Kingstreet, Hereford. Quantities supplied by the architect:—

W. Bowers & Co.	£1,283 0	H. Welsh.....	£1,100 0
Beavan & Hodges	1,159 0	J. Davies, Hereford* ..	1,013 14

* Accepted.

HEREFORD.—For the erection of a villa at Lower Bullingham. Mr. W. W. Robinson, architect, King-street, Hereford:—

H. Welsh.....	£665 0	J. Hiles	£518 0
R. Taylor.....	650 0	E. Norris, Little Dewchurch (accepted)	447 10
J. Davies	525 0		

HORNSEY.—Accepted for laying 1,000 yards super 2 in. thick of patent stone paving, for Colonel J. W. Bird, Woodside, Hornsey, N.:—

Lewis Griffiths, Bromley-by-Bow, E., 4s. 6d. per yard super for Patent Pengarvon Stone.

KING'S NORTON.—For the construction of a book-room, and making alterations at the workhouse at Selly Oak, for the Union Guardians. Mr. F. B. Osborn, architect, Bennett's-hill, Birmingham:—

T. Rowbotham	380	J. Smith & Sons.....	£333
J. Harley & Sons.....	365	B. Whitehouse, Monument-road (accepted)	321
T. Loud	340		
J. Barnsley & Sons	338		

LEYTONSTONE.—For alterations and additions at the "Cowley Arms" public house, High-road, Leytonstone, E., for Mr. J. Willson. Mr. Fred. A. Ashton, architect, Stratford, E.:—

Baskett & Atkins	£1,801	J. & H. Cocks	£1,363
North Bros.	1,794	Coulsell Bros.	1,333
W. Watson	1,660	F. Voller*	1,247
Hearle & Farrow.....	1,551		

* Accepted.

LONDON.—For the erection of the London and South-Western Bank, Dulwich Branch. Mr. Charles Barry, architect, 1, Westminster-chambers, Victoria-street, S.W.:—

	Portland stone.	With Front in	Bath stone.
J. & S. Bowyer	£5,598	.....	£5,018
Bryan & Son	5,527	.....	5,260
J. & C. Bowyer.....	5,466	.....	5,028
Nightingale	5,339	.....	5,165
Bird	5,200	.....	4,969
Duncan Stewart	5,200	.....	4,813
Macey & Son	5,190	.....	4,924
Rider & Son	5,168	.....	4,940
Colls & Son.....	5,146	.....	4,917
Sheppherd	5,139	.....	4,965
Higgs	5,100	.....	4,895
Mitchell	5,100	.....	4,850
Perry & Co.	5,088	.....	4,858
Smith & Son	5,087*	.....	4,797

* Accepted subject to alterations.

LONDON.—For making-up and paving roads, for the Vestry of the parish of Fulham. Mr. W. Sykes, New Streets Surveyor:—

—	Crown-road, Section 1.				Rostrevor-road, Section 1.			
	Roadway.	York paving.	Victoria paving.	Imperial paving.	Roadway.	York paving.	Victoria paving.	Imperial paving.
Tomes & Wimpey	305	298	282	267	251	42	41	40
Rogers.....	512	300	285	269	260	44	43	40
Nowell & Robson	473	279	—	—	266	36	—	—
Greenham	—	—	—	—	243	43	—	—
Mowlem & Co..	466	144	144	115	244	58	58	54
Victoria Stone Co.	—	—	228	—	—	—	35	—
Imperial Stone Co.	—	—	—	221	—	—	—	—

LONDON.—For taking up, redressing, and relaying approximately 7,000 yards superficial carriageway, pitching and wood-paving in the East India Dock-road, for the Poplar District Board of Works:—

	Wood-paving.	Stone-pitching.
	s. d.	s. d.
G. Anderson.....	7 9	3 6 per yard super..
Lewis Griffiths (accepted)	8 3	3 3 " " "

[Surveyor's estate 7s. 3d. and 3s. respectively.]

LONDON.—For rebuilding shop and premises, No. 29, High-street, Kensington, for Messrs. J. & F. Potter:—

Nash	£2,375	Leslie & Co.	£2,229
Duffield	2,344	Hearne	2,097
Kearly.....	2,339	McCormick & Sons*	1,987

* Accepted subject to reductions.

LONDON.—For painting and decorative works to be executed at the libraries, offices, &c., of the Honourable Society of Gray's Inn. Mr. Lewis H. Isaacs, Surveyor to the Society:—

Simpson.....	£615	Crossley	£502
Patman & Fotheringham ..	550	R. G. Worsley & Co.*	445

* Accepted.

LONDON.—For alterations and general repairs to No. 54, Walton-street, Lennox-gardens, Chelsea, S.W. Messrs. Pooley & Foilett, architects, 21, John-street, Adelphi, W.C.:—

Jones, Richards, & Co.....	£697	W. H. Watts	£580
James Sorrell & Co.	645	*R. & H. Bryon	480
Simmonds Bros.....	638	*Withdrawn after acceptance.	

LONDON.—For addition to the Home of Industry, London-fields. Mr. Geo. Barnes, architect, 4, Gt. Winchester-street, E.C.:—

F. & H. F. Higgs.....	£1,596	Mark Gentry	£1,397
H. L. Holloway	1,550	S. J. Scott	1,380
W. Sturmur.....	1,458	F. J. Coxhead, Leyton-stone (accepted)	1,189
B. G. Battley	1,419		

LONDON.—For the erection of superstructure to new offices and warehouses in Southwark-street, S.E., for Messrs. Bell's Asbestos Co., Limited. Mr. Thomas M. Lockwood, F.R.I.B.A., architect, 80, Foregate-street, Chester. Quantities by Mr. Frank Baldwin, 17, Church-street, Cardiff:—

Lathey Bros.	£18,500	Patman & Fotheringham	£17,973
Dove Bros.	18,330	S. & W. Pattinson.....	17,485
Frank Kirk.....	18,264	Holloway Bros *	17,285
J. T. Chappell	18,167		

* By change of stone and other reductions this amount has been modified and accepted.

LONDON.—For alterations and additions to No. 5, Thurloe-place, South Kensington. Mr. D. Carmichael, architect :—
Jones & Betts, 37, Chester-terrace, S.W. (accepted) £550 0 0

LONDON.—For rebuilding No. 84, Wimpole-street, W., for Mr. Samuel Lithgow. Mr. C. H. Worley, architect. Quantities by Mr. R. C. Gleed :—

Lawrance & Sons	£3,225	Bywaters	£3,179

LONDON.—For alterations and additions to No. 25, Welbeck-street, W., for Mr. Samuel Lithgow. Mr. C. H. Worley, architect. Quantities by Mr. R. C. Gleed :—
E. White (accepted) £1,700 0 0

LONDON.—For alterations and additions to No. 21, Harley-street, for Mr. G. Anderson Critchett. Mr. T. Phillips Figgis, architect. Quantities by Mr. R. C. Gleed :—
Simpson & Son £2,566 0 0

LONDON.—For rebuilding stabling and granary in Harley-mews North, for Messrs. H. & D. J. Oyler. Mr. C. H. Worley, architect. Quantities by Mr. R. C. Gleed :—

Bywaters	£2,297	Lawrance & Sons	£2,154
Simpson & Son.	2,155		

LONDON.—For alterations and additions to the Charing Cross-road Schools, for the School Board for London. Mr. T. J. Bailey, Architect :—

Neil	£3,427	Marsland, Wandsworth*	£2,416
Kick	2,450	* Accepted.	

LONDON.—For painting at the Borough-road and Gloucester-road, Peckham, Schools :—
Marsland (accepted) £850 0 0

LONDON.—For painting, &c., at Poland-street Workhouse, for the Guardians of Westminster Union. Mr. Jno. Waldram, C.E., surveyor, 13, Buckingham-street, W.C. Quantities supplied by Mr. Percy J. Waldram :—

Patman & Fotheringham	£795	Johnson & Manners*	£546
E. J. Hurley	588	W. Furniss	538
Grover & Son	580	W. & E. Mills	469
Vigor & Co.	568	G. H. Rowe	457
Geo. Hall	568	* Accepted.	

[Surveyor's Estimate, £557.]

LONDON.—For alterations to No. 80, Wood-street, for "Ye Mecca." Mr. Herbert Knight, architect, 129, Cheapside :—
G. Newton (accepted) £317 3 0

LONDON.—For fittings to Nos. 4 and 5, Creed-lane, for Messrs. Frazer & Co. Mr. Herbert Knight, architect, 129, Cheapside :—
Kirby & Chase (accepted) £173 0 0

LONDON.—For structural repairs to the church of St. Mary Aldermary, Queen Victoria-street. Mr. C. Innes, architect, 27, Queen-street, City :—

J. M. Macey & Sons	£778 0 0	Dove Bros.	£575 0 0
Prestige & Co.	584 0 0	Johnson & Co.	436 9 1

LONDON.—For sanitary alteration and decorations at 1, Arcol-road, N.W. Mr. M. E. Collins, architect, 61, Old Broad-street :—

Hampton & Son	£429	Davis	£355
Foxley	368	J. Shoolbred & Co.	316
Hamson	359	Taylor & Sons	299

LONDON.—For alterations and bar-fittings, &c., at the "Princess Louise," Holborn, for Mr. Brand. Mr. Arthur Chitty, architect :—
Simpson, Camberwell £755

NEWTON ABBOT.—For the extension of the chancel and south aisle of Highweek Church, for the Rector and Churchwardens. Messrs. Fulford, Tait, & Harvey, architects, Cathedral-yard, Exeter :—

Rabbich & Brown	£528 0 0	Parker, Newton Abbot	
Bearne	451 10 0	(accepted)	£439 0 0

OXTED (Surrey).—For proposed house for Mr. Henry Geard Mr. Edward J. Paine, architect and surveyor, 11, Great James-street, Bedford-row, W.C. Quantities supplied :—

Hunter & Bryant	£1,397	C. W. Charlwood	£1,190
J. & J. Ward	1,284	A. Foster	1,057

PLYMOUTH.—For building Mission Chapel, Amiby-place, Plymouth, for the parish of S. Matthias. Quantities by Mr. Jas. Harvey, Bedford Chambers, Bedford-street :—

F. C. Ambrose	£1,160 0 0	Pellow Bros.	£950 0 0
A. Ambrose	1,120 0 0	A. M. Coles	919 3 0
Tozer & Son	1,017 7 0	J. Finch	888 0 0
H. Kerswell	988 9 0	Lethbridge & Son (accepted)	865 0 0
T. May	953 0 0		

[All of Plymouth.]

PONTEFRACT.—For supplying, laying, and jointing water-pipes, Glasshoughton Waterworks, for the Rural Sanitary Authority. Mr. Malcolm Paterson, C.E., Manor-row, Bradford, Yorks :—
Jno. R. Maw, Hull (accepted) £1,054 0 0

RAMSGATE.—For the erection of three houses at Ramsgate. Messrs. Alfred R. Pite & Son, architects, 5, Bloomsbury-square, W.C. :—

Grummant	£964	Martin	£897
White Bros.	940	Home	875
Forwalk	899	Bowman	823

RAMSGATE.—For the erection of shop and premises, Pegwell Bay, Ramsgate. Messrs. Alfred R. Pite & Son, architects, 5, Bloomsbury-square, W.C. :—

Grummant	£286	Home	£249
White Bros.	274	Bowman	249
Martin	256	Forwalk	242

SOUTHAMPTON.—For alterations and additions to school, St. Denys, for the School Board. Mr. E. T. Howell, architect, 24, Portland-street, Southampton :—

Bull, Sons, & Co.	£1,784 0 0	Dyer & Sons	£1,662 0 0
Franklin	1,750 0 0	Stevens & Co.	1,660 0 0
Harvey	1,711 0 0	Crook & Son*	1,584 0 0
Boulton	1,699 8 4	* Accepted.	

SOUTHAMPTON.—For finishing twelve cottages at Northam, Southampton, for Mr. R. C. W. Dixon. Mr. William Burrough Hill, F.S.I., architect, Southampton :—

R. G. Evans	£1,200 0 0	Rowland & Son	£845 0 0
W. C. Mears	859 19 0	E. Sandon (accepted)	775 0 0

[All of Southampton.]

SPALDING.—For the erection of a vicarage-house and offices, Moulton St. James, for the Rev. C. Partridge. Mr. W. Bassett Smith, architect, 10, John-street, Adelphi, London :—

Ely & Baker	£765 0 0	Jellings	£634 10 0
Leversley	705 7 6	Money Bros., Whaplode Drove, Wisbeach*	589 5 0
Watson	675 0 0		

* Accepted.

STOCKTON-ON-TEES.—For the erection of a Vicarage-house, St. James', Portrack-lane, for the Rev. J. C. Fellowes. Mr. J. P. Pritchett, architect, 24, High-row, Darlington. Quantities by the architect :—
John Cooke, Stockton-on-Tees..* £1,515
* Accepted for the whole work.

WATFORD.—For the erection of a recreation-hall at Leavesden Asylum, for the Metropolitan Asylums Board. Messrs. A. & C. Harston, Architects, 15, Leadenhall-street, E.C. :—

J. Payne	£6,637	T. Turner	£5,897
Leslie & Co.	6,600	W. Johnson & Co., Ltd.	5,866
J. & R. Waterman	5,974	C. Miskin, St. Albans*	5,844

* Accepted.

WILLESDEN.—For laying-out grounds, drainage, and building chapels, lodge, &c., for cemetery at Willesden, for the Willesden Burial Board. Mr. C. H. Worley, architect. Quantities by Mr. R. C. Gleed :—
R. Ballard (accepted) £6,024 0 0

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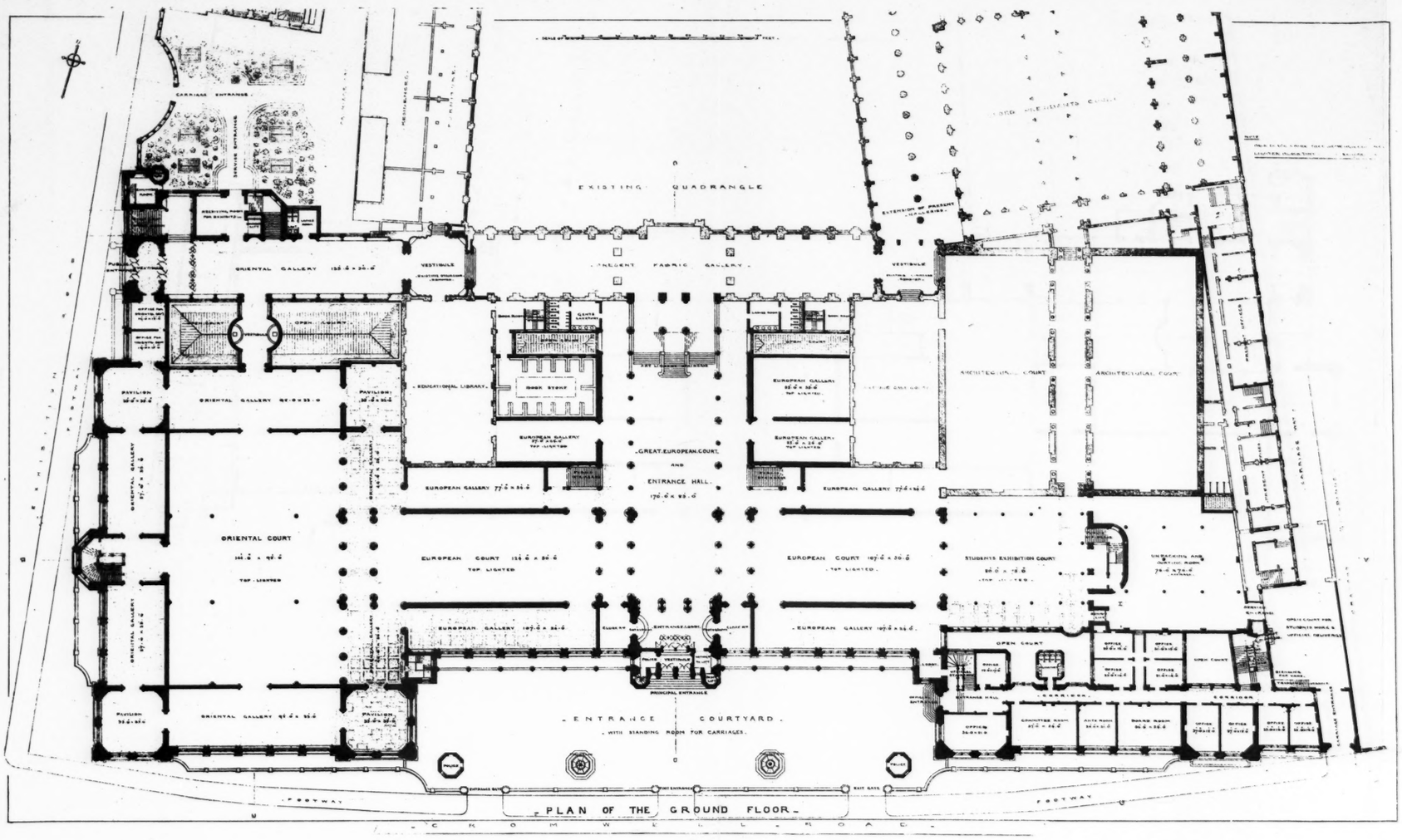

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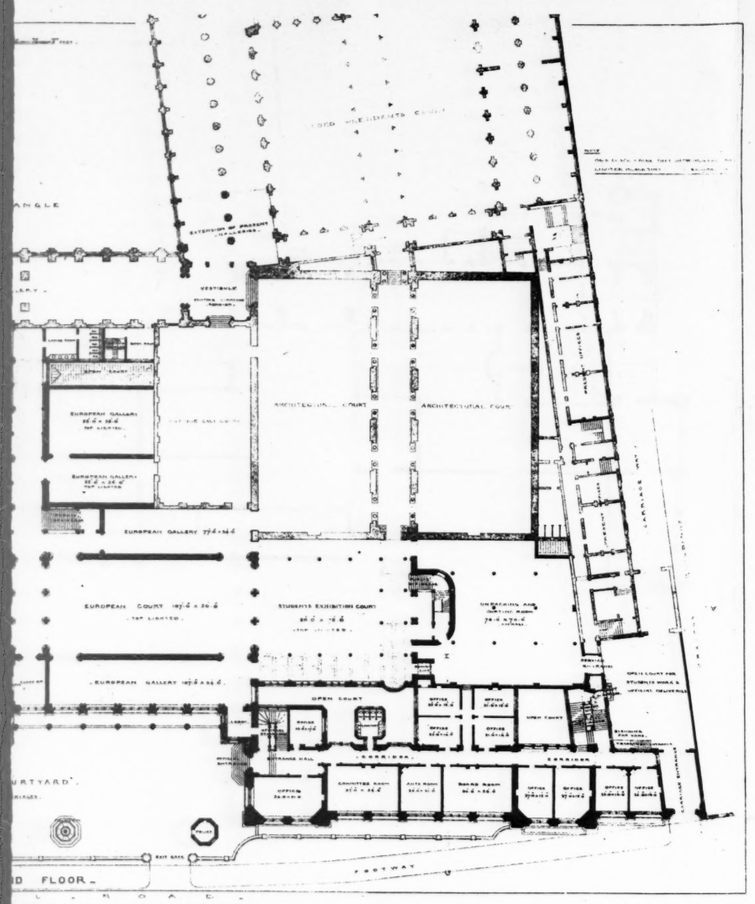
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